RAILROAD GAZETTE

FRIDAY, APRIL 29.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Atchison, Topeka & Santa Fe: Central of New Jersey; Denver & Rio Grande; Elmira & Lake Ontario; Lake Shore & Michigan Southern; Michigan Central; New York, Chicago & St. Louis; New York, Susquehanna & Western; Norfolk & Western; New York & Greenwood Lake; St. Louis, Arkansas & Texas; Vicksburg & Meridian.

Elections.—Housatonic, William H. Stevenson, General Manager.—Louisville, Evansville & St. Louis, T. L. Dunn, Chief Engineer.—Mississippi & Tennessee Rivers, C. B. Howery, President.—Mississippi River & Northwestern, W. B. Dutton, General Manager.—New York, New Haven & Hartford, W. H. Turner, Superintendent of New York Division.—New York & New England, A. A. Jackson, General Superintendent.—Ohio & Mississippi, Robert Reid, Treasurer.—Poughkeepsie Bridge Co., W. W. Gibbs, President.—Seattle & West Coast, Henry Crawford, Jr., President.—Southern Kansas, of Texas, W. B. Story, President.—Toledo, Ann Arbor & North Michigan, J. M. Ashley, President.—Union Pacific, T. J. Potter, General Manager.—California Central, George O. Manchester, President.

New Companies Organized.—Attica, Anderson & Western files articles in Indiana.—Clinch Valley is organized in Virginia.—Chicago Terminal Railway & Transit Co. files articles in Illinois.—Cleveland & Southwestern is incorporated in Ohio.—Dardanelle & Little Rock files articles in Arkansas.—Far Rockaway is incorporated in New York.—Little Rock Belt files articles in Arkansas.—San Juan files articles in Colorado.—Seattle & West Coast files articles in Washington Ter.—Wyoming, Colorado & Pacific is incorporated in Colorado.

Personal.—Died, John F. Moulton.

Changes and Extensions.—*Alabama:* East Alabama road will be extended 17½ miles.—*Arkansas:* Missouri Pacific is to begin its extension from Fort Smith; Newport, Jonesborough & St. Louis begins survey.—*Florida:* Silver Springs, Ocala & Gulf is completed to Dunnellon.—*Indian Territory:* Gulf, Colorado & Santa Fe is connected with the Atchison, Topeka & Santa Fe.—*Michigan:* Chicago, Milwaukee & St. Paul is said to be preparing for extension of 175 miles.—*Mississippi:* Vicksburg & Meridian will build branch.—*Nebraska:* Chicago, Burlington & Quincy is graded to Colorado boundary.—*New York:* Canastota, Morrisville & Southern institutes survey.

Leases and Sales.—Bangor & Piscataquis will lease the Penobscot Central.—Chicago, Illinois & Eastern was sold on April 27.—Indianapolis, Decatur & Springfield will be sold on May 25.—Kentucky Central is sold.—Union Pacific leases the Oregon Railway & Navigation Company's lines.

Annual Reports.—Chesapeake & Ohio, for year to Dec. 31, 1886, shows increase of 21.8 per cent. gross and 24.4 per cent. net.—Pittsburgh, Cincinnati & St. Louis, for the year ending Dec. 31, 1886, shows gain of 17.8 per cent. gross and 1.2 per cent. net.

Traffic.—Anthracite coal shipments for the week ending April 23 show an increase of 25.0 per cent., as compared with corresponding week last year; bituminous shows increase of 87.9 per cent.; coke, for week ending April 16, shows increase of 21.4 per cent. Cotton receipts, interior markets, for week ending April 22, show a decrease of 69.7 per cent., as compared with corresponding week last year. Shipments show a decrease of 60.4 per cent.; seaport receipts show decrease of 67.6 per cent.; exports a decrease of 11.4 per cent.; cotton in sight is less than at same date last year by 33.8 per cent.

Earnings.—Eleven roads report gross and net earnings for March, 9 showing a gain in the gross earnings and 2 a loss; 10 show increase in net earnings and 1 a decrease.

Miscellaneous.—Chicago, Madison & Northern roads of Illinois and Wisconsin are consolidated.—Chicago, Burlington and Quincy offers issue of $12,000,000 4 per cent. bonds. Nascopec road is opened for traffic.—Wheeling & Lake Erie changes hands.

Contributions.

True Economy in Bridge Building.

ANN ARBOR, Mich., April 2, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Dec. 10, 1886, you published two valuable briefs of a 255 ft. span prepared by Mr. Geo. H. Pegram. Inclosed you will find a copy of the second of these briefs, with five to six additional lines to ascertain stresses in *l*, *m*, *n*, *o*, *p* and *q*. These lines are all the additional lines necessary for the designing of the bridge in accordance with the method of dimensioning advocated in my letter published in your issue of March 25, 1887.

This small additional labor is hardly worthy of consideration, and is certainly more than compensated by the fact that it fixes definitely the safe unit stresses in all members, without necessitating the individual judgment of an expert engineer on each member of the truss.

Following the brief are given the values of the safe working stress for the various members of the truss, these values being obtained by the proposed formulæ. The unit stresse for members in compression would be still further reduced by the adoption of one of the many column formulæ.

The example given illustrates the fact that the method we propose involves the greatest change in the lightest bridges and in the lightest members of the same bridge, the change in these cases being from a lighter to a heavier section. The method, therefore, is in accordance with experience, for every engineer knows that he has seen the time when he has not dared to make certain members as light as his calculation called for. His experience in such cases being more reliable than his theory. For the same or corresponding members in larger bridges, however (as for instance the posts and ties at middle of truss), our argument is his experience has failed him, and a few weak links have been inserted in a comparatively strong chain. For instance, consider the *f* in the example given. This tie would, according to "standard" specification, be strained to 10,000 lbs. per square inch, while formula (*A*) gives 6,800 lbs. per square inch. Thus, if built to standard specification, we argue that the sectional area of *f* is .68 of what it should be. In the same way the sectional area of chords is .93 of what it should be. Therefore the chords are $\left(\frac{.93-.68}{.68}\times 100=\right)$ 36 per cent. stronger than the tie *f*, and consequently about 36 per cent. of the weight of each truss is wasted. This great waste could be avoided by slightly increasing the weight of the smallest members of the truss.

In the brief the assumptions made are the same as those made by Mr. Pegram, in fact down to the dash line it is an exact copy of his brief, with the exception of the figures between [].

A. D. OTTEWELL.

Brief of 255 ft. Whipple span, in 12 panels of 21.25 ft. depth 32 ft.

Dead load = 600,000 lbs. = 25,000 lbs. per truss panel.
Live load = 2,900 lbs. per foot + 25,000 lbs. concentrated.
Chord strains:

Panel load $= \frac{2900}{2}\times 21.25+\frac{25000}{12}=32.9$ live + 25,000 dead = 57,900.

Chord compound for short tie $= 57.9\times\frac{21.25}{32}=38.450$.

Chord compound for long tie = 38450 × 2, =76,900.

$a = 38.4\times 5\frac{1}{2} = 211.2 = 211{,}200$
$b = (a) + (38.4\times 2\frac{1}{2} = 96.) = 307{,}200$
$c = (b) + (76.9\times 2 = 153.8) = 461{,}000$
$d = (c) + (76.9\times 1\frac{1}{2} = 115.4) = 576{,}400$
$e = (d) + (76.9\times 1 = 76.9) = 653{,}300$
$f = (e) + (76.9\times \frac{1}{2} = 38.5) = 691{,}800$

Web strains:

Length of short tie $= \sqrt{21.25^2+32^2}=38.4$
Secant $= \frac{38.4}{32}=1.2$
Length of long tie $= \sqrt{42.5^2+32^2}=53.1$
Secant $= \frac{53.1}{32}=1.66$

Summations.

10	9	8	7	6	5	4	3	[2	½]
30½	24½	20½	15½	12½	8½	6½	3½	2½	½.

Uniform live load panel co-efficient $= \left(\frac{2900}{2}\times 21.25=30.8\right)\times\frac{1}{12}=2.57$.

Concentrated live load panel co-efficient $= \frac{25000}{2}\times\frac{1}{12}=1.04$.

	Normal.	Inclined.
$a = (30.8+25)\times 5\frac{1}{2}+1.04\times 11$	$= 318.3\times 1.2 =$	382,000
$b = 30.8+\frac{25000}{2}+25 = 68.3$		
$c = 2.57\times 30\frac{1}{2}+1.04\times 10+25\times 2\frac{1}{2}$	$= 151.3\times 1.2 =$	181,600
$d = 2.57\times 24\frac{1}{2}+1.04\times 9+25\times 2$	$= 122.3\times 1.66 =$	203,000
$e = 2.57\times 20\frac{1}{2}+1.04\times 8+25\times 1\frac{1}{2}$	$= 98.5\times 1.66 =$	163,500
$f = 2.57\times 15\frac{1}{2}+1.04\times 7+25\times 1$	$= 72.1\times 1.66 =$	119,700
$g = 2.57\times 12\frac{1}{2}+1.04\times 6+25\times 0\frac{1}{2}$	$= 50.9\times 1.66 =$	84,500
$h = 2.57\times 8\frac{1}{2}+1.04\times 5+25\times 0$	$= 27.0\times 1.66 =$	44,800
$k = 2.57\times 6\frac{1}{2}+1.04\times 4-25\times 0\frac{1}{2}$	$= 8.3\times 1.66 =$	13,800
$l = 2.57\times 3\frac{1}{2}+1.04\times 3-25\times 1 =$		
	$12.9\times 1.66 =$	−21,400
$m = 2.57\times 2\frac{1}{2}+1.04\times 2-25\times 1\frac{1}{2}$	$= -29.0\times 1.66 =$	−48.100
$n = 2.57\times \frac{1}{2}+1.04\times \frac{1}{2}-25\times 2$	$= -48.2\times 1.66 =$	−80,000
$o = 2.57\times \frac{1}{2}+1.04\times \frac{1}{2}-25\times 2\frac{1}{2}$	$= -60.7\times 1.2 =$	−72,800
$p = -\frac{700}{2}\times 21.25 = -7{,}500$		
$q = -25\times 5\frac{1}{2} = -165{,}000.$		

	Hangers					
	a	*a* and *b*	*c*	*d*	*e*	*f*
Min. *B.*	165,000	7,500	72,800	80,000	48,100	21,400
Max. *B.*	382,000	68,300	181,600	203,000	163,500	119,700
=	.43	.11	.4	.4	.3	.18
Safe working stress.	9,300	6,100	9,000	9,000	8,000	6,800

ALL TOP CHORD 9,300.

ALL BOTTOM CHORD 9,300. HANGERS, 6,000

Railroad Legislation in Minnesota.

ST. PAUL, Minn., April 19, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your issue of April 15 a few editorial remarks regarding the railroad bill passed during the last session of the Legislature of this state.

As you make no comment upon certain sections of the bill which appear to me to need some attention, I would respectfully suggest examination of Sections 1 and 5, which contain the following:

Sec. 1.—After enumerating the usual privileges of issuing commutation tickets, etc., says "Nothing in the provisions of this act shall be construed to prevent common carriers subject to the provisions of this act *from issuing passes for the free transportation of passengers.*"

Sec. 5.—"That if any common carrier subject to the provisions of this act shall directly or indirectly by any special rate, rebate, drawback, or other device, charge, demand, collect or receive from any person or persons a greater or less compensation for any service rendered in the transportation of persons or property * * * * than it charges, demands, collects or receives from any other person or persons for doing for him or them a like and contemporaneous service in the transportation of passengers or property, such common carrier shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared to be unlawful."

The absurdity of legislation, which in one breath blows hot and cold, condemning in one place discrimination of all kinds, and in another countenancing, nay, especially sanctioning, a form of discrimination which receives the fervent condemnation, both of the traveling public and of railroad officials, is too apparent to need much exposition. It would seem incredible that such a clause could obtain entrance into a bill, in other respects, with a few comparatively trifling exceptions, made to conform to the inter-state model, had we not had the opportunity to watch the workings of the legislative mind and to hear their utterances upon the matter of free transportation during the session. There was, of course, an honorable and clear headed minority who saw the harmful effects of this effort to protect the legislator in his long exercised and much valued prerogative of extracting from the public treasury a certain allowance for the expenses of his railroad journeys, which were to him without any other cost than for his incidentals. But the hard-headed majority triumphed.

Can there be needed at this time any more conslusive demonstration of the incapacity of the average legislator as now elected or controlled, and the consequent danger to which railroads are subjected by having, practically, their affairs controlled, and their policy dictated, by bodies of this kind?

G.

Slack in Freight Trains.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the recent experiment in freight train service on the Chicago, Burlington & Quincy, showing the force of shocks experienced by reason of the free slack in the ordinary link and pin couplings, I beg your indulgence to say a few words.

In addition to the experiments already tried, it would undoubtedly be of considerable interest to railway men if a test was made of the relative performance of locomotives with trains actually equipped with hook couplers and with the link and pin upon a section of road involving curves and grades, with a view of determining how far the lateral flexibility of couplings is desirable.

The lateral play of the link coupling allows each car of a train to be guided by the track alone, while the more rigid union given by the hook coupler tends to keep the cars in a straight line, and it is the opinion of many practical men that the hook type of coupler would, for this reason, cause an undue flange pressure on curves, and thus materially lessen the efficiency of the locomotive.

The trials made thus far, of close and slack coupled trains, have been with the link and pin couplings only, the free slack being taken up by means of wedges so as to simulate the hook or close form of coupling. This method does not, however, give any proof in the direction of the comparative resistance on curves, as the lateral flexibility of the coupling remains, notwithstanding the fact that most of the slack is taken up by the wedges.

It is to be hoped that this feature of the coupler question may receive some attention at the coming brake tests to be held at Burlington, as it is understood that some of the trains will be equipped with hook couplers.

As to the shocks in freight trains caused by the slack in link and pin couplings, it is generally conceded that they are objectionable, and, recognizing this, I have devised a buffer for freight cars, one purpose of which is to take up the free slack except just enough to admit of the unrestricted movement of the pin in coupling and uncoupling.

This device is similar to the Miller buffer in principle, and is designed to occupy the same space and to take the place of the present "dead woods," and to apply it no changes are necessary—even in the bolt holes.

The casing is made of cast-iron, in which the spring is inclosed. The buffer head and stem are of wrought iron. The former is 8 by 8 in., and the latter is 1½ in. diameter. The stem passes through the bumper block and end sill, and is secured by a nut on the inner end, which serves as well to regulate the compression of the buffer spring. The nut is locked by a key passing through the stem.

These buffers extend far enough beyond the end of the draw-bar to take up the slack, except ½ in. when the standard 10½ in. link is used.

It will be seen that all concussion, by the cars coming together, will be received directly on the buffers, thus re

lieving the uncushioned blow which the dead woods and end sills are now subjected to in the case of violent contact, in switching or otherwise, where the blow is greater than the elastic strength of the draw-bar spring. The buffers will also practically eliminate the shocks caused by braking, running through sags and pitching over grade summits when trains are on the road, while the lateral play requisite in passing around curves will be preserved.

This form of buffer might be used advantageously in connection with the Buffer brake, as it would prevent the shocks which are now experienced. Its practicability under any circumstances with the link and pin coupling will, I think, be readily recognized. T. L. MCKEEN.

The Electric Railroads of the United States.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Horse service for street railroads has been found utterly inadequate. Out of 120,000 horses on street car lines, from 20,000 to 25,000 become practically useless every year and are sold for a song. Attendance is costly, and as to the noisome stables, it has been well said that the motive power of the New York Central could be comfortably installed in the barns of some of the New York City street railways. Moreover, in extreme hot and cold weather, the efficiency of the horse is at its lowest, though it should then be at its highest; and any abnormal demand for transportation results in terrible cruelty to the drivers and their teams, in suffering and annoyance on the part of passengers, or in absolute cessation of traffic with loss to the management. Besides there is always the liability to an epizooty, and to a strike, when for days together the horses "eat their heads off."

Steam within city limits is less and less in favor as a remedy for this state of things, but the cable road has been found to offer many points of advantage on large and busy roads. But the first cost of a good cable system is extremely heavy; the line is, unfortunately, a unit; the cable runs with difficulty on sharp curves; the ponderous cable must be run at all times—itself consuming some 75 per cent. of the total motive power—whether 5 cars or 50 are attached; when the road is built it cannot well be extended, and a steadily large traffic is necessary to meet expenses. These and other objections have tended to check the use of a method that is, without question, an immense improvement upon horse locomotion.

With electricity there is a remarkable flexibility of application and range of choice as to method. The car can carry its own power in storage batteries; the current conductors may be put out of sight in conduits; a third rail can be placed on any existing track; or the car may depend for current upon an overhead wire with contact trolley or brush; and all of these can be used together, if necessary, on one road. I have been on street railways where each of these plans is exemplified and have found all practicable and operative. The motor can be put anywhere, even on the roof, and can be geared up in a dozen different ways. The average recovery of power is easily 60 to 65 per cent., and in every case the current required is exactly proportionate, at the minute, to the work being done. A first-class horse-car costing $1,200 will, with an electric motor, cost from $2,000 to $2,250, but the horse-car road has from 6 to 12 horses per car, the horses costing about $125 to $150 apiece. The cost of the electric conductors is more than offset by the wear and tear of a horse track. The central station electric plant will, in many cases, be more than paid for by the economy in real estate, and it can be put anywhere along the line or near it. It can also, as it does now, supply electric light and power for general purposes.

Coming to the work actually done, it will be best to speak of the performances of the various motor companies, seriatim. The Daft Electric Light Co., of this city, has now had running at Baltimore for about two years a road using the third rail system, but now adopting the overhead wire. With an annual increase of passengers of over 75,000, the cost of electric power per car per day has been $4, as compared with the former cost for horses of $6.50 per car per day. The speed has been increased from 4 miles per hour with horses to 8 miles with motors. This road is 2 miles long, with grades up to 350 ft. per mile, and undulating throughout. The road has 3 motor cars and 3 passenger cars. Another road built on the Daft system is now in operation at Los Angeles, Cal., using the overhead wire. It runs 3 miles and is to be 2 miles longer. It has 4 motors and 4 cars, each of which has a carrying capacity of 40 persons, but has often carried twice that number. The road carried 14,982 passengers during February, and has taken as many as 1,500 in a single afternoon. The speed maintained is usually from 10 to 12 miles an hour. The Daft overhead system is also being employed on the Orange, N. J., Crosstown Railroad, where one motor car has been placed on the completed section of track. Another Daft road is being built at Pittsburgh, by the Safety Electric Railway and Power Co., of New York. It is to cost $120,000, will have both overhead and conduit conductors, presents the slight difficulty of a 14 per cent. grade, and will go into operation this summer with 5 motor cars. The Daft system is also under contract for Mansfield, O. and Ithaca, N. Y.

The Van Depoele Electric Manufacturing Co., of Chicago, has a number of electric street railways in operation, presenting some novel features. The road of the Port Huron, Mich., Electric Street Railway Co. has 3 miles of track, one 15 H. P. motor running 3 cars, and two 10 H. P. motors, each running an independent car. The road crosses a swing bridge, but the overhead wire is so arranged that while the circuit is not broken when the bridge is open, the contact for the car is remade automatically as the bridge closes. The road is undergoing extension and increase of rolling stock. At Windsor, Ont.—a suburb of Detroit—a short road with 2 cars runs along the bank of the Detroit River. At Detroit is a road 1¼ miles long, with one motor car which, with its train, has traveled at the rate of over 25 miles an hour. The service is being increased. At Appleton, Wis., the Appleton street railway put the Van Depoele system in operation last year. The motive power is obtained from a 60 H. P. dynamo driven by a water wheel, and a double overhead conductor is in use. The initial rolling stock consisted of 5 cars with motors, but the plant is growing very rapidly. The road is 4½ miles long, including 9 per cent. grades, some on sharp curves. The total cost for power for the 5-car service figures out at $1.50 per car per day.

At Scranton, Pa., the Scranton Suburban Railway Co. has over 2 miles of Van Depoele road running with great success. The rolling stock was 3 cars at the start, but is being largely increased. Overhead conductors are used, with little contact trolleys. Speed ranges from 6 to 15 miles an hour. Grades are up to 6 per cent. As on the Appleton road, handsome Pullman cars are in use. The power is furnished by the electric light station, where a 60 H. P. dynamo is installed. The total charge for power is $9 per day of 16 to 17 hours, but as the dynamo can easily operate from 8 to 10 cars, the item of $3 per day per car is excessive. It will, in almost every case of electric railways with current conductors, be safe to estimate from $2.50 to $3 per day per car as the total cost of power, that being a liberal basis of calculation.

At Montgomery, Ala., the Van Depoele system was tried on a road 1¼ miles long, and is now being applied to the whole network, with overhead conductors throughout. The total length of track thus equipped is over 11 miles, consisting of a main trunk road with four branches. Brill cars are to be used, with 18 motors. One of the owners of the road told me recently that he had found a saving with electricity of from 30 to 40 per cent., and he expected much better results over the whole system.

The Van Depoele Co. has contracts now being executed for roads at Lima, O., and Binghamton, N. Y. The latter road, 4½ miles long, will be equipped with 3 cars with 10 H. P. motors, 4 cars with 15 H. P. motors and 1 car with a 20 H. P. motor. The Lima road is 3 miles long and will have 6 cars.

The Denver, Col., Tramway Co. has 3½ miles of road equipped with the Short-Nesmith system, and has 7 cars in operation, making an average speed of 6 miles an hour. The conduit in use has a ⅝-in. slot. The track crosses five steam railway tracks, eight horse-car tracks and a bridge 200 ft. long. The current lights the cars and rings the gongs.

At Detroit, Mich., the Detroit Electrical Works are operating on the Highland Park road 2 cars, 13 hours per day, using not to exceed 900 lbs. of coal, at $1.60 a ton, bringing the cost of fuel somewhat under 80 cents, or 40 cents per day per car. The Fisher system is in use. A speed is maintained of about 15 miles an hour with a load of 30 passengers to the car. The motors, weighing 1,100 lbs., are suspended between the trucks. The road is three miles in length, but is now being extended half a mile further. It is operated by two engineers and a motor man, who also acts as conductor, for each car. A simple conduit system is in use, a light rail, over which a phosphor bronze contact wheel travels, being sunken between the rails under grooved planks. The system is now to be applied in Pittsburgh, where it is under contract for a road about one mile long, beginning with 2 cars.

The Henry Electric Railway Co., Kansas City, has equipped with overhead conductor a double track road starting from East Fifth street, and proposes to run two-car trains on it. The same company reports that it is also equipping a 9 mile road in the suburbs of San Diego, Cal., where very high speed will be attained.

The Union Electric Co., of Philadelphia, has a 2-mile road on the Schlesinger system, with conduit, on Ridge avenue, Philadelphia. Just at present, however, the company is busy on the construction of mining roads. It is now executing a contract for a large mining company, the road, wholly in the mine, being 6,000 ft. long. The electric locomotive will haul from 15 to 20 loaded cars. Similar equipment is being contracted for on two other mine roads, and in one of these cases, by the way, an electric power transmission of 400 H. P. over three-quarters of a mile is contemplated.

The Sprague Electric Railway and Motor Co., of New York, has built a road for the East Boston Sugar Refinery Co., running from the water front up into the refinery, to convey sugar in bulk. An overhead conductor is used, with contact trolley and flexible connector. The cars will have a carrying capacity of 4½ tons each. The dynamo supplying current for the road during the day will feed incandescent lamps at night. The Sprague system has also been adopted by the Union Street Railroad, of St. Joseph, Mo. At least 20 cars will constitute the preliminary equipment; current from the electric mains will also light the cars, and speed up to 12 miles an hour is to be reached. The Sprague Co. has also been making some important tests with storage batteries on street cars, with remarkably good results, under the supervision of one of the best known firms of street railway engineers in the world. One such car has been ordered for a Boston road, and though the experiments have but recently been finished, the company has had applications from well nigh a hundred roads for estimates looking to the use of the storage system. A very large number of estimates have also been requested and made for roads with the direct current system, using overhead conductors or shallow conduits. I have had an opportunity of looking through the estimates and find them to cover roads all over the Union, sometimes two or three in one city.

The Bentley-Knight Electric Railway Co.'s conduit system is to be used in New York City by the North and East River Railway Co., whose tracks will run through Fulton street, across the city, to Wall and Pavonia ferries. The Bentley-Knight system, which has been specially worked out with a view to use in large cities, was demonstrated first on a road in Cleveland, O., and is now to be seen on a track at the Rhode Island Locomotive Works, Providence. Its introduction into New York renders its details very interesting, but they cannot all be given. The nature of the thoroughfare and the heavy traffic on it calls for the best construction; the grades run up to 1 in 10. The conduit to be used is only 13½ inches deep and 25½ inches wide, over all, and the contact plows are so devised that in any case of necessity they can be pulled clean out of the slot at a second's notice. The road will go into operation with 20 motor cars, and the work of preparation is now going on busily, all the contracts having been made. As the franchise expressly stipulates the use of this system, there is no reason to doubt that it will go into operation this summer, probably by August 1.

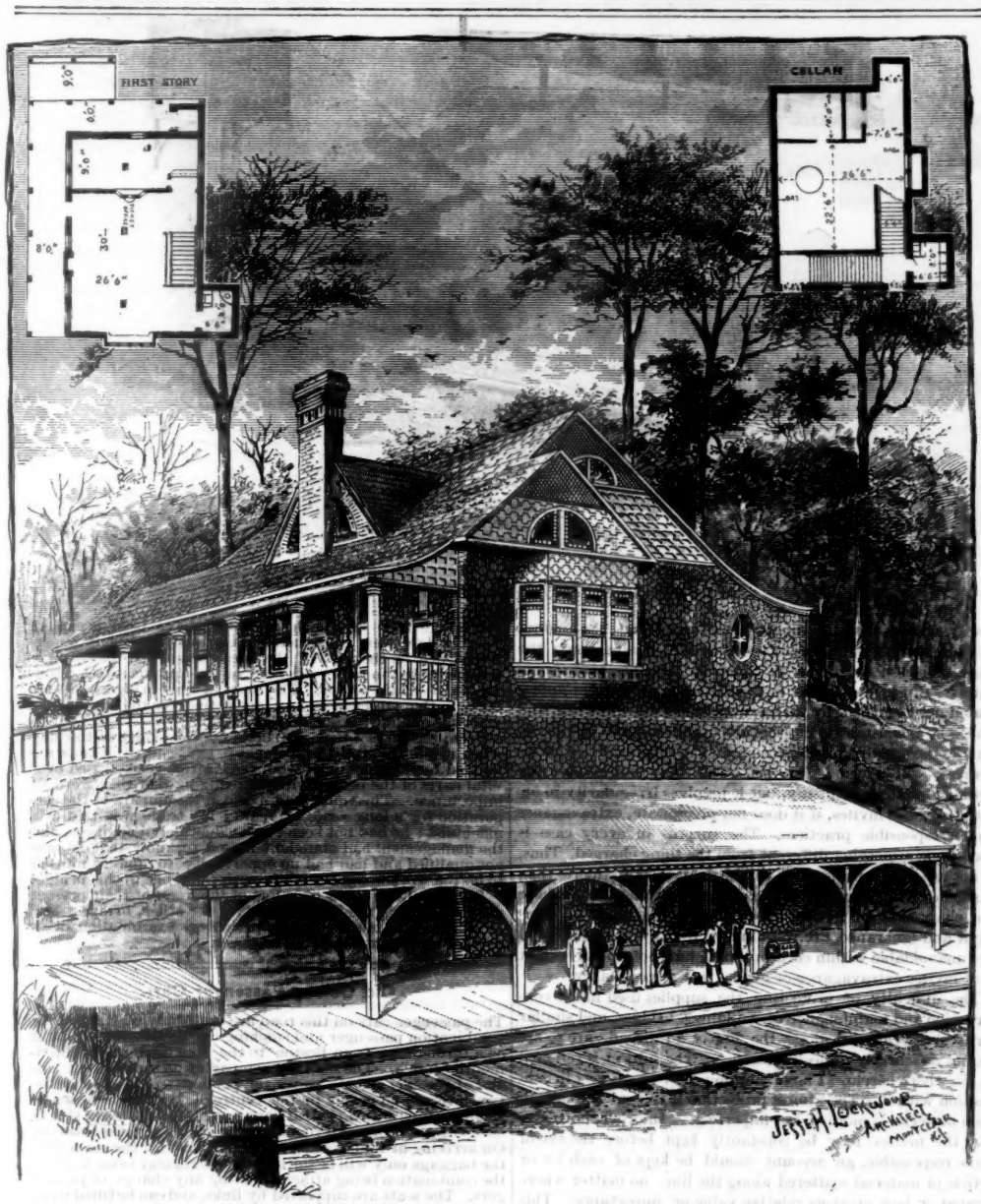
The Bentley-Knight Co. has also closed a contract this month with the Observatory Hill Passenger Railway Co., Alleghany City, Pa., and hopes to fill it by the end of July. In this road it supplies about 1,200 ft. of double track conduit, and about the same length of single track conduit; and then the conductors go overhead and run out some three miles in the suburbs. As soon as the conduit proves satisfactory, this road will be extended across the river into Pittsburgh. It is a really tough job, as there is a maximum grade of 10 per cent. to climb carrying a full load, Broadway cars, at a rate on that stretch of not less than 4 miles an hour.

I ought not to omit mention here of the fact that this is the system in view for the New York Underground Railway, which, if the plans are carried out, will be a magnificent piece of engineering all round. The motors intended for this are of 400 H. P., capable of making 50 miles an hour, and weighing 48,000 lbs.

The Julien Electric Co., of New York, has made a demonstration with its storage battery and motor on the Eighth Avenue road in this city. I have, myself, had the pleasure of trying the car, which was very smooth, steady and rapid in operation. The system is now also being tried in St. Louis, and bids fair to be adopted in a great many places. With the storage batteries of the Electrical Accumulator Co. of New York, driving such motors as the Sprague, some excellent results have also been attained. As far as can now be learned, running street cars by electric storage will not cost more than $4 to $5 per day, on regular city schedule and traffic, as compared with $6.50 to $7.50 for horses. The cost of the cells is still high, but comes within the cost of horses—from 6 to 12 per car—and will, in my opinion, be materially reduced by improvements in the batteries inside of a twelvemonth. With the storage system, no conductors or conduits are needed.

There are some new systems awaiting trial, such as the Ries, Bidwell, Edgerton, Field and others, embodying some very notable points of excellence, but it would take too much space to discuss them now, as it would the experiments made, and yet to be made, on the New York elevated roads, or the various roads shown at exhibitions and other like resorts during the last 4 or 5 years, and having to their credit about 500,000 passengers carried in safety and comfort. I must also pass by such special systems, dependent on electricity, as the Enos suspended car road, which is to be adopted at Los Angeles, Cal., and the Chandler aërial transportation road. I must close simply with an enumeration of the roads and places about to adopt electricity. At Ansonia, Conn., an electric road, 3½ miles long, from Derby to Birmingham and Ansonia, using overhead wire, has been contracted for. It will be used for both freight and passengers, and power to drive the dynamo will be taken from the Housatonic dam. At Newton, Mass., a road is to be built by a company already formed; one is proposed for Worcester, Mass. At Brookline, Mass., two will soon be in operation, and one each is in view at Bangor and Biddeford, Me. Two roads are contemplated in Brooklyn, one at Coney Island, and one at Rockaway. Pelham Park, N. Y., is to have a road this summer, and Asbury Park, N. J., is advertising for bids on another. Franchises are asked for a road in Jersey City and Bayonne; and Plainfield, N. J., is also wanting a road. In Pennsylvania, Scranton with one successful road is to have another, and probably two. A road is to be built from Carbondale to Jermyn, 4 miles. In Reading, the Perkiomen Avenue Company proposes to adopt electricity. Harrisburgh is to have a road, and it looks as though before the end of the year Pittsburgh will have half a dozen. Down South steps have been taken to construct new electric roads, or adopt the system on old roads in Jacksonville, Fla.; Pensacola, Fla.; Birmingham, Ala.; Selma, Ala.; Atlanta, Ga.; and Fort Smith, Ark. Among roads spoken of in Ohio are several at Cincinnati, Cleveland, Tiffin and other places. Wichita, Kan., is proposing to adopt electricity for its street cars. Lincoln, Neb., has formed a company to operate an electric railway from the business part of the town to the stock yards. In San Francisco, a road is to be built on Fillmore street hill, and roads are also wanted at San Jose and Riverside, San Bernardino County. If I were at liberty to do so, I could add to the above list about fifty names of places where, from present indications and movements, it is safe to say that electric roads will be running within a year.

The electric railway to-day is by no means the thing it should be. Opportunities for improvement can be seen in almost every detail. But this revolution—or evolution—on the street railways of the country has begun, and will work itself out in a perfected development. When Peter Cooper raced his steam locomotive against two fast horses, he was wounded in the hand by an accident, and the team won. But



GLEN RIDGE STATION—DELAWARE, LACKAWANNA & WESTERN RAILROAD.

I believe the steam railway is now admitted to be a success, and such a success the electric railway is also destined to be.

THOMAS COMMERFORD MARTIN.

How To Warm and Ventilate Passenger Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Warming cars in passenger trains in cold weather, without danger of fire in case of accident to train, and how to cool and ventilate them in warm weather, is a subject of so much importance that a plan for doing it is proposed as follows:

To warm them, take air from smoke-box of locomotive by pipes or flues and pass it through train by means of blower under cars, geared to axle, and out at rear of train. Warming is to be done by radiation from pipes or flues or other suitable device. Appliances for doing this are simple in construction, with no machinery but blower. It is believed it will improve draft, increase combustion and thus help make steam and strengthen the locomotive rather than weaken. Heat enough can, no doubt, be had to warm while running, as many cars as a locomotive can handle in regular service.

Cost of fitting train, as compared with other methods, is small. When once prepared, there is no cost to get heat. What would otherwise be wasted is used. There is no liquid to in any way do injury. When train is stopped, it may be left without danger from cold. Connections are to be devices believed to be new and durable, and such that coupling and uncoupling can be quickly done.

To cool and ventilate, small additions are to be made to apparatus used to warm, and air taken from front of locomotive, which will, of course, be clear from smoke, dust, cinders or sparks, and passed, cooled by ice, if desired, through the cars in such a way as to produce ventilation. It will pass out of cars at various places where it usually comes in, filled with dust.

Stoves made safe against fire in case of accident may be used to warm before train is started, or when warming cannot be done from locomotive, for any cause, as when cars are set off at way stations or at junctions to be taken on branch roads, or train delayed for any considerable time, say from being snow-bound.

The writer of this believes that, while many ways have been proposed for warming cars from locomotive by steam or air, and some tried with fair success, no one meets the wants of the case so nearly as the one herein proposed, and, besides, this has its advantage of being used in warm weather to cool and ventilate. There is nothing about the means but that any one of ordinary intelligence can handle. He also believes that no way has been devised, or ever can be, of warming cars from locomotive that will not sometimes need stoves in the cars. Read in *Railroad Gazette*, April 22, "A Plea for the Independent Heater," fully supporting this opinion. Railroad men have diligently sought means to do without stoves in cars. That they are still in use is good evidence of the difficulty of doing without them.

The foregoing only outlines the method and advantages, which will be better understood when construction and working shall be explained in detail.

A train could be fitted now in time for cooling and ventilating the coming summer and be ready for warming when cold weather comes. If any railroad company wishes to try this method the writer will show how to put in what is needed. One that knows how can fit a train at railroad shops. Who asks to have it done?

Criticisms and suggestions are hereby invited. Objections will be welcomed.

Communications addressed to "Eureka," care of this journal, will be answered.

The Otter Creek Bridge Accident.

BALTIMORE, Md., April 19, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The second coroner's jury called on the above-named accident adjourned on the 14th * * * and they wrote it down as "their *opinion that the falling of said bridge was due to defective welding of eye bars used in the construction of said bridge, and that there was gross negligence in the want of inspection of the welded irons used in the construction of said bridge*," and thereto they signed their names.

As before stated, in my letter printed in your issue of the 8th inst., these eye bars were cut and welded to fit my drawings, by the Roanoke Machine Shops, under the inspection of the Norfolk & Western R.R. officers, and no portion of the inspection was in my hands, and I would have promptly stopped the work of erection if I had known or suspected that my men's lives were being risked daily on such worthless workmanship. My foreman, Inglesby, had previously, and by accident, found and sent back to the shops with his compliments a badly-welded bar which had been sent to him for use in another bridge, and this seems to have caused the shop men to be more careful as to outward appearances, at least, if not also as to inward strength.

The jury passed no word of censure upon my methods of erection, although a number of civil engineers and one or two bridge-builders testified that they considered that the condition of the structure *as described to them* was unsafe, but foreman Inglesby and such of his expert practical iron bridge builders as survived, and were called in, testified that they considered it safe. These men had been risking their lives on their own judgments at all hours and under all conditions of the work, and they new better than any one else where the danger line was. They were and are ready to go on with the work of erection if assured that their lives will not again be jeopardized by bad welds or other causes beyond their control.

In addition to this testimony, there was the fact that the railroad company's inspecting engineer, Goodwin, a man of very ripe experience in the replacement of structures under heavy train service, had been on the work several hours every day during its progress, and was waiting to board the caboose of the very train that knocked out the span, after having satisfied himself that everything was safe, the jury, in its wisdom, preferred to side with these practical men.

In my letter of the 8th I stated that three bars of this span had been found broken in the welds, but I have since found that only two were broken in the welds, and that the other was broken several inches from the weld, and by a bending strain put on it during its removal from the wreck. But there is still one quarter post bar not yet resurrected, although some weeks have now elapsed, and a sagacious juryman found among the piled up bars of the fourth span, not yet erected, a bar that was simply sickening, for he dropped it about three feet and it parted in a weld which showed only about five per cent. of bright iron.

I do not agree with Professor Thornton's computation of 2,640 lbs. tension strain per square inch arising from a live load of 2,500 lbs. per lineal foot of bridge. This live load, divided among the four trusses, gives 62,500 lbs. per truss distributed load, and according to the hypothesis upon which all Fink trusses have been built, one-fourth, or 15,625 lbs., of this goes each way from the foot of a main post 20 ft. high, up along a diagonal chain 54 ft. in length to the end pin. Multiplying 15,625 by 54, and dividing by 20, gives 42,000 lbs. strain on the diagonal chain, which is composed of four bars 3½ × ⅝, making 8.75 sq. in., and this figures out 4,800 lbs. per square inch, instead of 2,640. If Professor Thornton is correct, the many thousand lineal feet of Fink bridge which are still carrying trains in America (North and South) are nearly twice as strong as they were intended to be.

FRED H. SMITH.

Glen Ridge Station.

The engraving of the Glen Ridge station gives a correct idea of its outlines, but black and white lines are inadequate to convey the impression produced by its charming colors. The blue black trap rock, of which it is built, was found on the Orange mountains already broken by some prehistoric volcanic explosion or upheaval, and the fragments were gathered and placed in these walls without in any way trimming or cutting them. The corners are trimmed with brick. The Newark & Bloomfield branch of the Delaware, Lackawanna & Western road, at this point, 13 miles from New York, passes through a cutting in the brown sandstone, 18 ft. deep, and the architect's problem was the adaptation of a railroad station, post-office and express office to the peculiar location. The obvious criticism on the result is the placing of the agent at the end of the building farthest from the track, where he cannot have visual notice of approaching trains; done, evidently, for the comfort and pleasure of waiting passengers, affording them an airy room, with a romantic prospect from the bay window overhanging the cut. But with the simple and cheap electrical devices now so common this objection may be largely obviated. Electrical annunciators are a great convenience at any station, and should be provided even where the agent has a good outlook; and where he does not have it they are doubly necessary. The interior finish is yellow pine and ash, oiled and shellaced; the stairs are broad and "easy," and the express and baggage hoist lightens the agent's work. As in many similar cases, the expense of this suburban station has been borne partly by the railroad company and partly by a citizen—the latter, in this case, being Mr. A. G. Darwin.

Track Materials.

[From a forthcoming treatise on "The Handling of Railway Supplies," by Marshall M. Kirkman, Copyright 1887. Space permits only briefer extracts than it would otherwise be desirable to make from the advance sheets of this valuable Treatise.]

Supplies to be used in repair and maintenance of track are ordered, primarily, by the various section foremen. These orders are supervised by the inspector or roadmaster and then forwarded to the division superintendent or official immediately in charge for certification. The limited facilities that section foremen have for storing material, makes it desirable to restrict the amount in their possession. They require enough to carry on current repairs and meet extraordinary exigencies. They should, however, as a rule, never carry over a month's supply, and it is possible that their stock may be replenished even more frequently than this in some cases. The track supplies of a company should be kept, with its other material, at a central store-house and should be sent from thence directly to the section foreman as needed. There is no necessity or special utility in separate supply depots for track or other material, and their existence can only multiply expenses. The greater the concentration of material, the less the cost of handling, and the greater intelligence in disbursing. The multiplication of store-houses should be carefully avoided. They are required on different divisions, and at various centres where equipment and tools are repaired, but there is no necessity for more than one store-house or one store-keeper at any particular point.

* * * * * * * * *

When material is forwarded to a track section, it should

be charged to the section receiving it, the same as if it were forwarded to a store-house. The store-keeper or accountant in general charge of track supplies should open a material account with each section, the gross debit to these various accounts making the total amount of track material on his book charged against him on the general books. Foremen in charge of sections should be acquired to acknowledge the receipt of material and make returns at the end of the month the same as other store-keepers, showing the amount received during the month, amount used, for what purpose, and amount on hand. Such a system of returns is not difficult to maintain and will render it easy for officials to maintain a proper supervision over track supplies. The lack of clerical skill upon the part of section foremen is so well understood, that it was the general custom at one time not to require from them any report whatever of material received, used, or on hand. It was assumed that they could not make such a return, and material was charged directly to the operating or construction account (whichever it was intended for) when sent to the section, instead of waiting until it was actually used, which latter event might be weeks or months afterwards. This was a very simple way of getting it off the books and into expenditures, but its tendency was to encourage wastefulness. The books failed to show the the quantity of materia on hand or where located, and the resulting ignorance encouraged excessive accumulations of supplies and careless handling. The belief in the lack of clerical skill on the part of section foremen was partly real, partly imaginary. Any extended statement is difficult for many of them to make but they can set down figures, and if the names of the articles are printed and they are only required to enter amounts opposite in columns provided therefor, they can carry on a system of accounting that answers very well as a basis for those at headquarters in writing up the records. Different methods of accounting have been devised for securing a correct system of track accounts. One was introduced by the writer several years ago and has worked very well. It does not contemplate any book-keeping on the part of the section foreman, but that they shall make such returns of material received, used, and on hand, as to permit the store-keeper at headquarters to determine accurately in regard to track supplies.

* * * * * * * * *

The proper care of material in the hands of section men needs to be constantly looked after. All old material that has accumulated, except rails, should be collected daily and stored in some convenient and safe place. Tools and supplies of all kinds should be so guarded as to prevent their being misappropriated or damaged. More or less losses are suffered unavoidably in connection with both new and old track material in consequence of lack of storage facilities. In some instances no provision whatever is made. In many cases, however, proper use is not made of the facilities that are provided; care is not taken to store new material, and old material, instead of being collected promptly, lies scattered along the line. Economy and efficiency require that wherever facilities are lacking the evil should be corrected as far as possible; that where they are provided due use shall be made of them. It is not necessary to especially refer to the inspection of track material here. Its peculiar nature requires the services of experts in such matters, and in order to secure responsibility on the part of sellers much material must be watched long after its insertion in the track to determine its quality. One familiar with the inspection of track material writes:

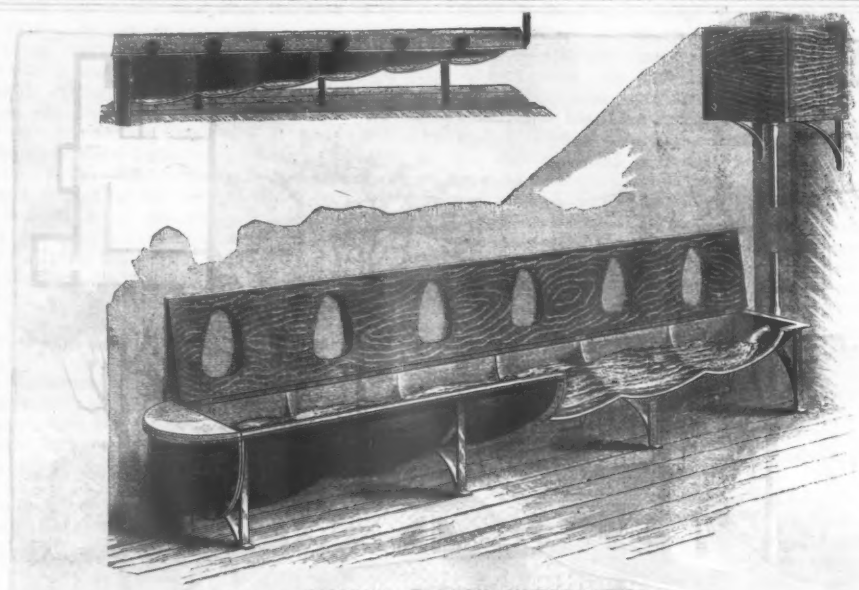
"The inspection of track material is important. Angle bars, by reason of worn rolls at the mill, will come in such shape that they cannot be fitted to the rail properly; rails are oftentimes defective; track bolts fall short of the required length, and split bolts have only the semblance of a split and are consequently unfit for use. In fact, track material needs a good deal of careful watching if a company expects to get what it pays for and receive what it wants."

In order to simplify the ordering of material by section foremen, they should be supplied with a printed list of the articles they use, so that all they need do is to enter the quantity opposite the article and sign their name thereto. The point to be aimed at in track accounts, should be to reduce the labor of section foremen to the minimum. This can best be done by using printed forms for such returns as they are required to make of material received, used and on hand.

BUILDINGS, BRIDGES, FENCES, ETC.

Many of the conditions that attend the use and handling of track material are observable in connection with bridges, culverts, fences and buildings. Their construction and maintenance require material to be widely scattered, rendering it exceedingly difficult to protect it or for a store-keeper to locate its whereabouts or ascertain its use. To do this it is necessary for him to require returns from foremen of the material used on each structure, where procured, etc. A separate account should be opened with each lot of material located along a line to meet contingencies, or forwarded for particular use. This will require that the store-keeper in charge should have almost as many accounts on his books as the store-keeper in charge of track supplies. The reports rendered him by foremen, while not as accurate in many respects as they should be, will afford him much of the information he requires, and when lacking will, at least, give him a hint of what is going on, so that he may make other disposition. Amongst other embarrassments, he will experience the difficulty common to every department of the service, namely, the difficulty of securing accurate information in regard to the disposition of material left over after the completion of a work. This is one of the most prolific and stubborn sources of error in railway accounting. The material ordered for the construction or repair of a particular thing may be said to be always in excess of the amount needed. What the amount of this surplus is and what becomes of it, it is necessary the store-keeper should know in order to keep his books accurately. But his necessities in this direction are neither appreciated nor regarded by those who carry on the work, and unless he is constantly on the alert and minute in his enquiries the amount or disposition of the surplus, in many instances, will never be known. This may not involve any actual loss to a company, but it involves irregularity in accounting, and invites, if it does not precipitate, extravagance and irresponsible practices. The surplus in every case is used upon something different from the thing charged. Thus, if not reported, one account will be debited with more than it should, while another will be charged with less, or perhaps not charged at all. These irregularities, the result of oversight and ignorance, are well known to railway officials and are unavoidable within certain limits, but not to an extent that invites extravagance or evades just responsibility.

The difficulty of protecting the supplies used in the construction and maintenance of buildings, bridges, and similar structures scattered along the line of a railroad, are so apparent as scarcely to need reference. The subject is referred to elsewhere herein. I have nothing new to suggest in connection with it. The utmost protection it is possible to afford such material is more or less imperfect. In order, however, that the matter may be constantly kept before the eye of those responsible, an account should be kept of each lot or article of material scattered along the line, no matter where located or how great its relative value or importance. This will serve as a constant reminder to those in charge and will prevent material being overlooked or forgotten. This is, so far as the store-keeper is concerned, about all that he can do towards protecting and caring for it. He should, however, require frequent and special reports from foremen and others of each lot of material located along the line or elsewhere, so as to discover any omissions or inaccuracies in his returns.



PARSONS' TROUGH WATER-CLOSET.

Parsons' Trough Water-Closet.

The design shown is patented by Mr. W. Barclay Parsons, Jr., Chief Engineer of the Fort Worth & Rio Grande Railroad, and was made by him and first put in use at Elmira while he was Division Roadmaster on the Erie.

The result secured is the advantage of having a body of water such as is found in a washout closet that may be periodically and automatically removed, thus combining the advantages of a school sink and water-closet without the offensive character of the former and the frailty and liability to abuse of the latter.

The trough, having no valve or complicated outlet, is not choked up by any material which can pass through the outlet pipe, and this pipe may be of any size. In the flushing apparatus the quantity and time of discharge, either separately or together, can be regulated at pleasure and so adjusted to the demands of the hour. During hours when not in use the water can be shut off. This combination gives an inexpensive, automatically self-cleansing water-closet. The absence of chains or springs prevent the curious or wilfully malicious from tampering with the flush. The control of the flush is in the hands of the janitor or proper authority only. Water being in motion will prevent freezing. The engraving shows a single hinged seat for the six divisions; but the manufacturers, the Meyer-Sniffen Company, of New York City, also make them with any desired number of seats, with partitions between.

Commissioners' Report on the Forest Hills Disaster.

The Massachusetts Railroad Commissioners on April 27 sent to the Legislature their report on the bridge disaster of March 14, on the Boston & Providence. The full report has not yet reached us, but a dispatch gives the following summary of its conclusions:

The contract for rebuilding the bridge in 1876 was made without proper examination as to the standing of the contractor. Those who acted for the corporation in making the contract had not sufficient knowledge of iron bridge building to enable them to pass intelligently upon the design and specifications. The design and specifications for the bridge were not such as should have been accepted. The bridge was constructed practically without superintendence on the part of the corporation, and the corporation neglected to preserve a copy of the specifications, drawings and strain sheets. The tests of the bridge were not made in the presence of any one acting for the corporation who was qualified to judge of their value.

From the time of the construction of the bridge to the day when it fell the railroad company had caused it to be examined by one man only, who, year after year, passed over vital parts of the bridge without realizing that they were of importance. This man had been in the employ of the corporation for a long series of years; his trade was that of a machinist; he had not been educated as a civil engineer, and the management had abundant reason to know that he was not qualified and had had no opportunity to qualify himself to do the work assigned to him with reference to this bridge.

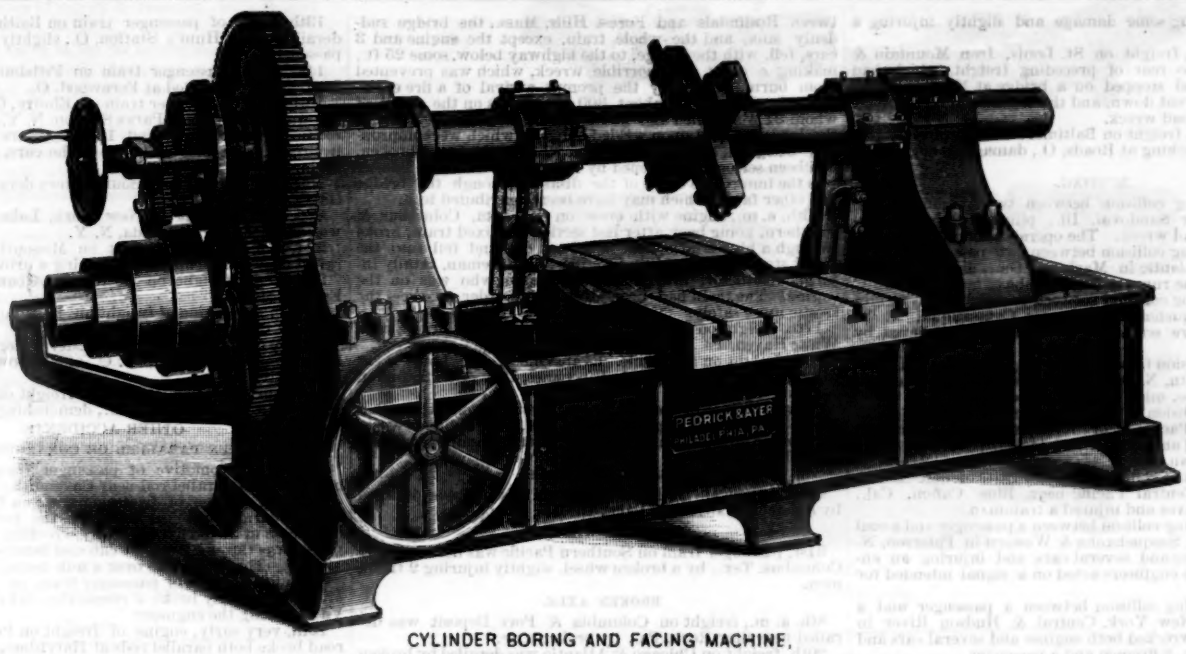
The Board warns the directors of the road of their present duty concerning the inspection of all its other bridges, and recommends a law requiring periodical examination of all bridges by a competent civil engineer.

Old Colony Passenger Cars.

The passenger cars on this road are uniformly 60 ft. long. A combination passenger and smoking car has been lately built as a through car from Boston to the New Bedford or Dartmouth branch. The smoking compartment is placed at one end of the car, and the passenger portion at the other. Between them and nearly in the centre of the car is a washroom opening into a central gangway. On the other side of the gangway is a small room for the conductor and a saloon. On arriving at the junction of the branch with the main line, the baggage only will be shifted into the regular branch train, the combination being attached saving any change of passengers. The seats are supported by links, and can be tilted when the back is reversed. This seat has been recently introduced by Mr. Geo. Buntin, of Philadelphia and Boston, and it is claimed that the seat is firmly secured against side motion, and once reversed is held steadily. The legs and side of the seat are in one casting of very neat design. The nickel plated arm rest is, however, separate. A wood lining of bird's-eye maple, mahogany, etc., is used. The designs differ in every car, and the cars have a very pleasing appearance, without any extravagance or straining after effect. The trucks have 42 in. wheels, various makes, the Allen paper wheel, the English spoke wheel and the Paige wheel being used under different cars. The side and end sills of the trucks are strengthened with two ⅝ in. iron plates, running the whole depth of the sills.

The Introduction of Railroads in France.

The *Revue Général des Chemins de Fer* publishes a somewhat indignant protest, by M. Léon Aucoc, against the celebration in the year 1887 of the fiftieth anniversary of the inauguration of railroads in France, the substance of which is here reproduced. He says it is a grave historical error to which it is worth while to call the attention of the Academy. Anybody who is desirous of rendering justice to the initiative of the French in the matter of railroads, and to preserve that part of the national honor, cannot allow it to be said that railroads for transporting passengers and merchandise by the means of a locomotive was inaugurated first in 1837. "To celebrate 1887 as the fiftieth anniversary of French railroads is to misunderstand history; it is to lower the flag of France before the nations which we have preceded in this matter. Is it then an act of patriotism?" The following facts are from the official documents of the Ministry of Public Works: The concession for the railroad from Saint-Etienne to the Loire was dated Feb. 26, 1823; that for the road from Saint Etienne to Lyons, June 7, 1826; that for the road from Andrézieux to Roanne, Aug. 27, 1828; and for the road from d'Epinac to the canal of Bourgogne, April 7, 1830. All these concessions were made perpetual by royal decrees. Other temporary concessions were authorized June 9, 1833, and July 29, 1835. The railroad from Saint Etienne to Andrézieux was opened for traffic Oct. 1, 1828. It was 23 kilometres long. The railroad from Saint Etienne to Lyons was opened for 15 kilometres Oct. 11, 1830, and traffic on various branches began April 1, 1832, and April 1, 1833. At this latter date the line of 57 kilometres was completed. The railroad from Saint Etienne to Roanne, 67 kilometres, was opened Feb. 5, 1834; that from d'Epinac to the canal of Bourgogne, 27 kilometres, in 1835, and the road from Paris to Saint Germain, which was then 17 kilometres long, was opened only Aug. 26, 1837.



CYLINDER BORING AND FACING MACHINE,

Made by Messrs. PEDRICK & AYER, *Flanders Machine Works, Philadelphia.*

The expenditures on railroads up to the end of 1834, before the St. Germain concession, amounted to nearly 21,000,000 of francs.

These first railroads were designed exclusively, it is true, for the transport of freight by means of horses or stationary engines; but passengers were carried on the Saint Etienne-Lyons line in the month of July, 1832. In 1836 the passengers carried on this line exceeded 170,000.

Finally, it was in the month of July, 1832, that Marc Séguin, who had taken a patent in February, 1828, for a tubular boiler, used for the first time on the Saint Etienne-Lyons route the motor which gives to the railroads their true character, the locomotive. Passengers and merchandise were for the first time hauled on a railroad by locomotive in 1825, in England. Of the 215 kilometres opened for work in 1828, France had 18 kilometres, Austria 30, and the rest was in England.

In 1829 George Stephenson introduced on the Liverpool & Manchester road the true type of locomotive, with tubular boiler. It has been maintained in England that Stephenson did not know of the patent taken by Marc Séguin in February, 1828, but the priority of this patent cannot be denied.* In 1832 the locomotive was employed in France. In 1835, in a total of 868 kilometres, England had 461, France 142, Austria 245, and Belgium 20. As for the United States, a railroad of 24 kilometres was opened in 1830, which was worked by horses until 1831, and it was only in 1832 that the use of the locomotive began in that country. These are the facts, and they do honor to France, which was preceded only by England, and that by very few years.

Testing of Running Gear on the Northern Railroad of France.

The Northern Railroad of France has attained an enviable notoriety for the perfection of many of its appliances. Among others attention is called in the pages of the German *Organ* to the smoothness of the running of its passenger stock, and the methods by which it is attained.

M. Bricogne, the Chief Inspector of the Northern road, recognizing the importance for smoothness of traveling as well as avoidance of wear and tear, delays by hot boxes, breakage, etc., of perfect adjustment of the running gear, designed for his road complete appliances for testing the condition of the gear and of the distribution of the weight on the springs seeking to correct the roughness of traveling by greater perfection in these, rather than by increasing the weight of the vehicle; a direction in which we in this country have carried the attempt at improvement too far. He divides the imperfections of the running gear into six heads, which, with the means adopted for ascertaining them, are as follows:

1st. Inequality of diameter of two wheels on the same axle. This is ascertained by a wheel gauge similar in principle though differing somewhat in arrangement from that shown in the *Railroad Gazette*, p. 4, Jan. 1, 1886.

2d. The variations of the profile of the wheel tread from the standard profile, the uniformity of the diameter of each wheel at all points and the correct centering of the axle are tested by turning the wheel on lathe centres set on the centres of the axle, the tread in contact with a series of spring index points, which show on graduated scales the variations in the radius.

3d. The equilibrium of the pair of wheels on an axle is tested by turning the wheel with the axle delicately hung on lathe centres and observing whether it remains in any position in which it is left. If there is a tendency to take any particular position this is corrected by turning off some of the metal on the side of the wheel at the point where the heaviness occurs, or by riveting on a counter weight. Much improvement has been effected by this means in the slight tremor and jar sometimes found in cars.

4th. The axle with its two wheels is weighed on two separate scale platforms, and if one side is found to weigh more than the other the error is corrected by turning off the side of the heaviest tire or by adding counter-weights to the light one.

5th. To ascertain whether the gauge is correct, and at the same time whether the wheels travel in the same line, a frame is used straddling the wheels, with arms on each end, carrying forms corresponding to journal bearings, which fit exactly over the journals. Two other arms run between the wheels and carry spring indexes, which press against the insides of the wheels and show any variations from their true positions with reference to each other and to the bearings.

6th. The axle, with its wheels, is suspended at one point, and if this point falls out of the exact centre in order to produce equilibrium, further correction must be made.

It does not appear why test No. 6 might not be substituted for No. 4, or rather why No. 4 might not be omitted altogether. The proof of the importance of the nice equilibrating of the weights of each wheel and of the two together is had in the fact that railway coaches which had traveled with considerable tremor and rattle of the windows have been made to run smoothly and noiselessly without any repair whatever beyond the adjustment of the equilibrium above described.

To test the parallelism and rectangularity of the axles, the passenger shops of the Northern Railroad are provided with test pits, along the sides of which are laid out with great care the exact position of the centres of the axles for each type of car when the axles are square with the rail and parallel with each other. The centre of each axle is marked by a line at right angles to the rail, cut on a metal plate fastened to the pit wall which supports the rail. On each side of this line are parallel lines 2 mm. apart, which enable the observer to see at once how much change is necessary to correct an imperfect condition, and a second set of lines at right angles to the first enable him to see whether the wheels are standing in the same relative position to the gauge on all the axles tested. The observation is made by placing a centre point attached to a handle in the centre on the end of the axle, and dropping a plumb line from a slit made for the purpose in the handle bar upon the test plate.

The description of this part of the apparatus closes with a statement which seems pretty "stiff," as follows: A nicely-adjusted passenger coach had its wheel treads painted white, and was run from Paris to Creil, 30 miles, on the rear of an express train. The width of the tread that showed wear was only 2 to 3 mm., or ⅛ in.!

The writer "gives himself away" by observing that this showed that the carriage had no tendency to side motion or "wobbling" on tangents, and that the conicity of the wheels was sufficient on curves to keep the carriage in the centre of the gauge—a claim for the advantages of coning which surpassed anything hitherto advanced by its warmest friends. This method of painting the wheel treads and observing the wear is reported to be in common use on M. Bricogne's road for observing the condition of wheel treads and flanges.

Cylinder Boring and Facing Machine.

The accompanying engraving represents a Cylinder Boring and Facing Machine made by Messrs. Pedrick & Ayer, of the Flanders Machine Works, Philadelphia.

This machine is specially designed for boring locomotive cylinders, but will also perform any other work of a similar character.

This machine is built very heavy, is powerfully geared, and will bore cylinders from 10 in. to 25 in. diameter. The boring bar is solid forged steel, with steel screw and bronze thrust bearings. The boring bar is planed out on one side for a screw and nut that feeds the cutter heads along. The boring bar can be slipped through the bearing and gearing, or left standing while the tail bearing or back pedestal is taken away and the cylinder is placed in position over the bar. The feed-casing is made to feed either way and has two changes, to operate which it is only necessary to push in or pull out a pin in the centre of the hand-wheel. The facing head can be readily placed on the boring bar in any place desired, and if necessary, can be operated at the same time that the cylinder is being bored. The cutter-heads have a long bearing on the bar, and are arranged for four tools, that number being found by experience as the most desirable, as it distributes the stress or strain on the boring bar, and four times the amount of metal can be removed.

The bed is movable on the shears, and is easily set in position by the hand wheel at the forward end of the machine. The bed is made to suit customers as regards sizes and number of grooves for bolting down the work. The bed as shown in the engraving is 30 in. × 35 in. Different sizes of this machine are built.

Train Accidents in March.

The following accidents are included in our record for the month of March:

COLLISIONS.

REAR.

3d, p. m., passenger train on Fitchburg Railroad ran into rear of freight train on a siding near West Acton, Mass., wrecking the caboose and several cars, and injuring the conductor.

4th, freight on Indianapolis, Decatur & Springfield broke in two near Russellville, Ill., and rear section ran into forward one, wrecking 10 cars.

11th, p. m., freight on West Shore ran into preceding freight in Hampton, N. Y., doing some damage.

11th, freight on New Haven & Northampton ran over a misplaced switch and into some cars standing on a siding in Southington, Conn., damaging engine and several cars and injuring 4 trainmen.

17th, a. m., passenger train on Baltimore & Ohio ran into rear of another passenger train at the Y, Washington, D. C., damaging engine, 1 car, and injuring several passengers slightly.

17th, freight on Chicago, Burlington & Quincy ran into another freight in Red Oak, Ia., killing 1 trainman and seriously injuring another

18th, early, passenger train on Canadian Pacific ran into rear of a freight standing on the main track in Stittaville, Ont., wrecking a car containing vitriol, which ignited and burned up 10 cars and the consumable portion of the locomotive.

20th, very early, freight on Pennsylvania Railroad ran into rear of switching freight at Lilly's Station, Pa., wrecking engine and several cars and killing a fireman.

20th, night, freight on Buffalo, New York & Philadelphia broke in two near Brockville, Pa., and rear section ran into forward one, wrecking several cars.

21st, night, freight on Pittsburgh, Cincinnati & St. Louis ran into preceding freight at Sikelly's Station, O., damaging the engine and upsetting the caboose, which took fire from the stove and burned up.

21st, freight on Chicago & Northwestern ran into rear of another freight in the yard at Wheaton, Ill., damaging engine and several cars and knocking down a corner of the station building.

22d, freight on Troy & Boston stalled on a grade near Hoosac Falls, N. Y., was run into by a following freight, damaging engine and 5 cars.

23d, p. m., passenger train on New York, Pennsylvania & Ohio ran over a misplaced switch and into a freight on a siding in Salamanca, N. Y., damaging postal car and caboose and injuring a brakeman.

24th, p. m., freight on Cincinnati, Indianapolis, St. Louis & Chicago ran into some cars which had been left on the main track by a switching freight at Coal City, O., damaging the engine and 10 cars and slightly injuring engineer.

24th, p. m., freight on Pittsburgh, Cincinnati & St. Louis ran over a misplaced switch and into the rear of a freight standing on a siding in Wheeling, W. Va., and the momentum imparted sent the standing train into another near by, damaging 2 engines and several cars.

25th, passenger train on Pittsburgh, Ft. Wayne & Chicago, stopped to repair air brake near Leetonia, O., was run into by a following freight, damaging engine and several cars. The engineer of the passenger train was under the tender when the collision occurred and was crushed to death. One passenger fatally and 1 trainman and 6 passengers slightly injured.

29th, night, freight on New York, Lake Erie & Western ran over a misplaced switch and into a caboose in Sala-

* It is a matter of considerable doubt whether the tubular boiler on the Rocket was first suggested by George Stephenson or by Mr. Booth, the Secretary of the Liverpool & Manchester Railway, but it is unquestionable that the first patent for a multitubular boiler was granted to a London engineer, James Neville, of Shad-Thames, March 14, 1826, who thus preceded M. Seguin by nearly two years.—EDITOR RAILROAD GAZETTE.

mance, N. Y,, doing some damage and slightly injuring a trainman.

30th, very early, freight on St. Louis, Iron Mountain & Southern ran into rear of preceding freight, which had broken in two and stopped on a bridge at Mineral Creek, Mo. The bridge went down, and the engine and 6 cars were piled up in a very bad wreck.

31st, very early, freight on Baltimore & Ohio ran into preceding freight switching at Roads, O., damaging engine and caboose.

BUTTING.

3d, p. m., butting collision between two freights on Ohio & Mississippi near Sandoval, Ill., piling up engines and several cars in a bad wreck. The operator forgot orders.

5th, night, butting collision between two passenger trains on Western and Atlantic in Marietta, Ga., damaging both engines. One of the runners is said to have been asleep.

8th, night, butting collision between passenger and freight on Lehigh & Susquehanna at Lower Catasauqua, N. Y. Two trainmen were scalded and another was injured by jumping.

8th, butting collision between two freights on New Brunswick road near Perth, N. B., badly wrecked both engines and several cars. Cause, misunderstanding of orders.

12th, butting collision between a passenger and a freight train on Northern Pacific near Wheatland, Dak., wrecked both engines, killed an engineer and seriously injured a fireman and a brakeman.

14th, early, butting collision between two "double-ender" freights on the Central Pacific near Blue Cañon, Cal., wrecked 4 locomotives and injured a trainman.

15th, p. m., butting collison between a passenger and a coal train on New York, Susquehanna & Western in Paterson, N. J., wrecking engines and several cars and injuring an engineer. One of the engineers acted on a signal intended for another train.

16th, p. m., butting collision between a passenger and a freight train on New York, Central & Hudson River in Rochester, N. Y., wrecked both engines and several cars and injured an engineer, 2 firemen and a passenger.

18th, butting collision between two freights on Southern Pacific in Houston, Tex.; engineer killed.

19th, p. m., butting collision between two engines on Pennsylvania Co.'s road in the yard in Toledo, O., completely wrecked both engines and injured 4 trainmen and a boy.

19th, butting collision between two freights on Intercolonial near Red Pine, N. B., wrecked both engines and several cars. Cause, dispatcher's mistake.

20th, p. m., butting collision between a passenger and a freight train on Grand Trunk in Ingersoll, Ont., wrecked both engines and damaged several cars. Cause, defective air brake.

21st, p. m., engine on Pittsburgh, Cincinnati & St. Louis making a flying switch on a turn-table track in Steubenville, O., ran into another engine standing on the turn-table, slightly damaging both engines.

24th, very early, butting collision between a passenger and a freight train on Baltimore & Ohio at Leslie, Md., badly wrecked both engines and several cars. One trainman fatally and 2 severely injured.

24th, p. m., butting collision between two passenger trains on Pittsburgh, Cincinnati & St. Louis near Hagenbaugh, O., completely wrecked both engines and several cars and injured an engineer.

25th, p. m., butting collision between a passenger and a freight train on Southern Pacific near Tabor, Tex., wrecked both engines and several cars.

26th, early, butting collision between a freight and a coal train on Central of New Jersey near Rockport, Pa., wrecked both engines and 15 cars, killed a fireman and seriously injured both engineers. One of the trains failed to wait for orders.

26th, butting collision between two freights on Baltimore & Ohio at Campbell's Station, O., wrecking engines and several cars. One of the trains had orders to meet at this point, but ran by.

27th, very early, butting collision between two freights on Cairo, Vincennes & Chicago at Carmi, Ill., wrecked engines and killed a fireman.

27th, butting collision between two freights on Canadian Pacific, near Franktown, Ont., wrecked both engines and several cars.

29th, a. m., butting collision between two freights on Southern Pacific, near Dryden, Tex., wrecked both engines and seriously injured an engineer.

31st, butting collision between two freights on Chicago & Northwestern, near Oak Creek Station, Wis., badly wrecked both engines and injured a trainman.

CROSSING.

5th, freight on Wabash, St. Louis & Pacific ran into Cincinnati, Wabash & Michigan freight at the crossing in North Manchester, Ind., wrecking engine and several cars.

16th, a. m., Chicago, Milwaukee & St. Paul freight ran into Chicago & Northwestern freight at the crossing in Madison, Wis., wrecking engine and several cars.

25th, engine of freight on Delaware & Hudson Canal Co.'s road ran into engine of West Shore passenger train at the crossing in South Schenectady, N. Y., wrecking both engines.

DERAILMENTS.

BROKEN RAIL.

8th, night, passenger train on Pennsylvania Railroad struck a broken rail near Hightstown, N. J., wrecking two cars, one of which caught fire and was destroyed. A postal clerk was burnt to death, conductor and a passenger seriously and 3 passengers slightly injured.

11th, a. m., freight on Columbia & Port Deposit was thrown from the track by broken rail near Safe Harbor, Pa., wrecking 2 cars.

21st, p. m., freight train on New London Northern derailed by broken rail near Townshend, Vt.

25th, freight on Pennsylvania Railroad was thrown from the track by a defective rail near Leechburg, Pa., damaging several cars.

28th, passenger train on St. Louis, Iron Mountain & Southern struck a broken rail, and two cars were thrown from the track and turned over, killing a child and injuring several other passengers.

29th, early, passenger train on Wisconsin Central was derailed near Phillips, Wis., by a broken rail.

LOOSE RAIL.

15th, a. m., freight on Baltimore & Ohio was derailed near Lexington, O., by a rail which had been spiked down only at one end, slightly injuring the conductor.

15th, night, passenger train on Cleveland, Lorain & Wheeling was thrown from the track by the spreading of the rails at Barton, O.

BROKEN BRIDGE.

5th, night, passenger train on St. Louis, Iron Mountain & Southern broke through a trestle over Joachine Creek, which had been weakened by freshet, near Victoria, Mo., and the engine, mail, express, 2 baggage cars and the smoker went down into the swollen stream. Fireman and baggageman seriously injured, 2 passengers drowned.

14th, a. m., as a passenger train of 8 or 9 cars on the Boston & Providence was crossing the "Bussey bridge," between Roslindale and Forest Hills, Mass., the bridge suddenly sank, and the whole train, except the engine and 3 cars, fell, with the bridge, to the highway below, some 25 ft., making a great and horrible wreck, which was prevented from burning only by the prompt arrival of a fire extinguisher. There were about 300 passengers on the train, of whom 24 were killed and 115 injured. The floor system of the bridge rested upon welded hangers, which were improperly designed, and one of them, which was found broken, had been seriously weakened by rust. This defective hanger was the immediate cause of the disaster, though the bridge had other faults which may have been contributed to it.

16th, a. m., engine with crew on Marietta, Columbus & Northern, going back after last section of mixed train, broke through a high trestle near Dunbar, O., and fell into the rocky stream below, killing engineer and fireman, fatally injuring conductor, brakeman and a man who was on the engine. The train had been divided in order to cross the trestle more safely.

17th, freight on Lehigh Valley went through a bridge near White Haven, Pa., doing considerable damage.

23d, freight on Louisville, Evansville & St. Louis went through a trestle bridge near Vincennes, Ind. One trainman injured.

24th, a. m., freight on Norfolk & Western went through a bridge in process of repair near Liberty, Va., killing 8 workmen and injuring several others. The engine and several cars crossed safely.

DEFECTIVE SWITCH.

25th, passenger train on Ohio & Mississippi was derailed by a defective switch in Pana, Ill.

BROKEN WHEEL.

31st, passenger train on Southern Pacific was derailed near Columbus, Tex., by a broken wheel, slightly injuring 2 trainmen.

BROKEN AXLE.

8th, a. m., freight on Columbia & Port Deposit was derailed near Star Rock, Pa., by broken axle.

20th, freight on Chicago & Atlantic was derailed by broken journal near Marion, Ind., wrecking 17 cars.

26th, night, freight on New Haven & Northampton derailed by broken journal in Westfield, Mass.

BROKEN TRUCK.

22d, freight on Boston, Hoosac Tunnel & Western was derailed by broken truck near Hathaway, N. Y.

LOOSE WHEEL.

25th, freight on Norfolk & Western derailed by a loose wheel near Zuni, Va., wrecking 11 cars and injuring a brakeman.

FALL OF BRAKE-BEAM, ETC.

11th, very early, freight on Hartford & Connecticut Valley was derailed by a loose brake-beam in Deep River, Conn., wrecking several cars.

15th, noon, wrecking train on International and Great Northern was derailed by the falling of a brake-shoe near Nechez, Tex., injuring a laborer fatally and several trainmen less severely.

MISPLACED SWITCH.

17th, freight on Illinois Central ran over a misplaced switch at Hudson, Ill., damaging the engine and several cars and injuring the engineer and fireman.

17th, freight on Louisville & Nashville was derailed at Campbell's, Tenn., by a misplaced switch.

19th, night, freight on Philadelphia & Reading ran over a misplaced switch at Schuykill Falls, Pa., and the engine and 19 cars went over an embankment and were totally wrecked.

CATTLE.

15th, freight on Chicago & Northwestern ran over some cattle near Holstein, Ia., and the engine and 9 cars were thrown down an embankment and badly wrecked.

22d, p. m., freight on St. Louis & San Francisco ran over a cow and was derailed near Ozark, Mo.

SNOW.

2d, 2 engines of snow-plow on Burlington, Cedar Rapids & Northern were derailed and wrecked near Elkton, Dak., seriously injuring the conductor.

6th, very early, snow-plow on New York, Ontario & Western ran into a heavy snowdrift and was derailed near Trout Brook, N. Y., injuring several trainmen.

ACCIDENTAL OBSTRUCTION.

12th, very early, freight on San Francisco & North Pacific was derailed near Haystacks, Cal., by a stick of wood which had fallen from the locomotive, wrecking 6 cars.

MISCELLANEOUS.

11th, p. m., passenger train on Wisconsin Central derailed by purposely misplaced switch in Eau Clair, Wis., slightly injuring the engineer.

25th, several cars of freight on Chicago & Northwestern were thrown from the track while making a flying switch in Council Bluffs, Ia. A little boy standing near the track was killed and a man seriously injured.

29th, a. m., a switching train without an engine in charge of two brakemen on Wabash, St. Louis & Pacific broke in two and 6 of the cars ran off the end of a spur track in Del Rey, Mich. One of the brakemen was injured.

UNEXPLAINED.

1st, a. m., passenger train on Central Vermont was derailed near Rockingham, Vt.

1st, p. m., 4 cars of freight on Columbia & Port Deposit were derailed and wrecked near Safe Harbor, Pa.

2d, night, passenger train on Adirondack road was derailed near Corning's Hills, N. Y.

2d, night, passenger train on New York, Ontario & Western was derailed at Stony Ford, N. Y.

3d, p. m., car of freight on Buffalo, Rochester & Pittsburgh mounted a frog, and was derailed, in Buffalo, N. Y., damaging 2 cars.

4th, early, passenger train on Northern Pacific was derailed near New York Mills, Minn., damaging several cars and injuring 3 trainmen.

8th, early, freight on Pennsylvania Railroad was derailed in Philadelphia. Engineer hurt; 10 cars badly wrecked.

8th, night, passenger train on Missouri Pacific was derailed and thrown down an embankment near Hillsboro, Tex., injuring 1 passenger seriously and a number of others slightly.

10th, engine of passenger train on New York, Lake Erie & Western was derailed near Stairway, N. Y.

11th, noon, freight on Missouri Pacific was derailed near Whitewright, Tex., wrecking 9 cars.

11th, p. m., 2 cars of passenger train on Jacksonville Southeastern jumped the track near Girard, Ill., injuring 3 passengers seriously and a number of others slightly.

11th, p. m., 6 cars of freight on Philadelphia & Reading were derailed in Harrisburg, Pa.

11th, freight on Mobile & Ohio was derailed near Okolona, Miss., wrecking several cars.

12th, p. m., passenger train on Pennsylvania Railroad was derailed near New Egypt, N. J.

12th, p. m., 2 cars of passenger train on Baltimore & Ohio were derailed at Locust Point, Md., injuring a number of passengers.

12th, several cars of freight on Louisville, New Orleans & Texas were derailed near Harriston, Miss.

13th, 2 cars of passenger train on Baltimore & Ohio were derailed near Hunt's Station, O., slightly injuring several passengers.

14th, a. m., passenger train on Pittsburgh, Cincinnati & St. Louis was derailed at Fernwood, O.

16th, p. m., passenger train on Elmira, Cortland & Northern was derailed near Parks Station, N. Y., wrecking several cars. Three trainmen and 12 passengers were more or less injured. A fire started in one of the cars, but it was soon extinguished.

16th, night, freight on Southeastern derailed near Upatoic, Ga.

22d, p. m., freight on New York, Lake Erie & Western was derailed near Gowanda, N. Y.

22d, p.m., 3 cars of freight on Missouri Pacific were derailed near California, Mo., injuring a drover.

25th, p.m., freight on Boston & Albany was derailed at Enfield, Mass.

28th, p.m., engine of freight on Baltimore & Ohio was derailed in Baltimore, Md.

26th, 2 cars of freight on Western North Carolina were derailed near Marshall, N. C., and thrown in the French Broad River.

29th, early, a car of switching freight on Missouri Pacific was derailed in St. Louis, Mo., demolishing a watch house.

OTHER ACCIDENTS.

BROKEN PARALLEL OR CONNECTING ROD.

1st, early, locomotive of passenger train on Central Vermont broke a parallel rod near Cavendish, Vt.

2d, early, engine of passenger train on Baltimore & Ohio broke a parallel rod near Tiffin, O., the loose end tearing a large hole in the boiler and badly wrecking the cab. The engineer was thrown from the cab and fatally injured; fireman scalded. The engine ran over a mile before it was stopped.

8th, night, engine of passenger train on Newport News & Mississippi Valley broke a connecting rod near Gordonsville, Va., injuring the engineer.

12th, very early, engine of freight on Pennsylvania Railroad broke both parallel rods at Harrisburg, Pa.

17th, a m., engine of freight on Rome, Watertown & Ogdensburg, broke a parallel rod when near Antwerp, N. Y., wrecking the cab.

MISCELLANEOUS.

1st, a. m., 2 engines and a snow-plow on Canadian Pacific were caught in a snowslide near Selkirk, Can., and the superintendent and 6 employés were smothered to death.

9th, very early, passenger train on Southern Pacific ran over a misplaced switch and into the roundhouse in Lancaster, Cal., damaging several engines and knocking down part of the building.

22d, early, engine of freight on Delaware, Lackawanna & Western ran into some telephone wires which had fallen across the track, owing to the weight of the snow, in Orange, N. J., and was slightly damaged.

23d, early, truck of a freight car on New York, Lake Erie & Western broke near Pond Eddy, Pa.

23d, a. m., freight on Pennsylvania Railroad ran into a tree which had fallen across the track near Brookline, Pa., damaging engine slightly.

24th, p. m., passenger train on New London Northern was struck by some lumber falling from an adjoining car as it entered the yard at Brattleboro, Vt., breaking all the windows on one side of the smoking car.

25th, engine of passenger train on Boston & Maine broke two crank-pins when near Boston, Mass.

26th, night, on Pennsylvania road, in Philadelphia, a car loaded with horses in a freight train was lifted from its trucks and violently pushed against the tender next in front of it by a too sudden stop. Thirteen valuable horses were killed by the shock.

The Sewall System of Heating Cars.

This method of heating cars with steam from the engine has been previously described in these columns,* but the accompanying illustrations show more clearly the arrangement of the various parts.

The system is now in practical operation on the Maine Central Railway, and is being supplied to other important lines. It is claimed that cars heated by it have been kept at an even temperature of about 70° Fahrenheit, while the glass ranged outside from 40° below to 50° above zero, and admirable ventilation maintained, the elimination of coal dust, ashes, gases, and over-heated air by red-hot surfaces securing great purity of air in the car.

These appliances consist of an arrangement of steam pipes and valves, so situated and constructed that control is obtained of steam admitted into the cars of a railway train from the locomotive for heating purposes. The steam enters at the forward end of the train, where one valve in each car is so placed that the direction of the current is determined.

When desired, steam is admitted into the radiating pipes within the car placed at convenient points, and so distributed to every part of the car where heat is needed, and in amount as required; or the valve can be so placed that this car, or any car in the train, can be "cut off" and no heat furnished, if it is so desired, without in any way hindering the supply for any other car in the train.

The steam is always allowed a free exit into the air after having passed through the train, whether further heat for the train or not, and no careless manipulation of the controlling valve can ever obstruct this free passage, so all danger from an accumulation of pressure is avoided. Nominally, there is no pressure on the steam radiating pipes, simply a gentle current flowing through them to the opening at the rear, which is never closed.

The auxiliary boiler consists of a small hot well to receive the drip of condensed water from the pipes, having a small fire-box under it, with dumping grate and connected with the piping of the car, so that in case the car is set off at a time and place where heating is necessary and cannot be otherwise obtained, steam can be promptly generated to heat the car until it can be secured by an attaching engine or other source, when by the action of the dumping grate this fire-box is entirely emptied and no fire is then in existence in or about the car. This boiler is circular and does not extend below the axle of the trucks, and a small box under the car contains fuel supply for any reasonable time.

In case the boiler from which the usual supply of steam is obtained is for any reason cut off or disabled, this auxiliary

* See page 108, *Railroad Gazette*, Feb. 18, 1887; and page 193 of the issue of March 25, 1887.

will maintain the same comfortable temperature with safety until the usual source of supply is restored, be it longer or shorter.

The controlling valve in the car before mentioned also controls the action of steam from this source, and as one supply is shut out the other is by the same movement simultaneously opened.

The couplings consist of two like halves with interlocking devices constructed in such a manner that they are securely locked together, will withstand any pressure and remain tight except when, by cars separating, the hose is straightened, when they automatically release each other. The details of the couplings are shown by figs. 1, 2 and 3.

Fig. 1 represents a side view of coupling uncoupled; *A* represents a casting, cast hollow to allow the tube *B* to be inserted, which securely holds the gasket *C* in position, On tube *B* is cast a flange *D* which is held securely in position by the two bolts *E E*. The interlocking device consists of grooved projections *F* and *G* with tooth *H* and space *I* which engage their like parts on opposite half.

Fig 2 represents a top view of coupling in the act of being coupled.

Fig. 3 represents a side view of coupler as coupled between cars.

The following is an explanation of the letters of reference in Figs. 1, 2, 3.

A A.—Hollow casting of body of coupling in like halves

B B.—Tubes fastened by clamp in steam hose.

C.—Rubber gasket. *D D*.—Flanges cast on tubes *B B*.

E E.—Bolts holding tubes *B B* and gaskets *C C* in position.

F G.—Grooved projections of Interlocking device. } Each engaging like parts on
H I.—Tooth and space of Interlocking device, } opposite half of coupling.

The system of piping, drainage and position of parts on train are shown by fig. 4, which represents one car with side broken away to show couplings at each end of car and other parts, the right-hand of car being nearest the source of steam. The end of the tender is shown on the extreme right hand of fig. 4.

The following is an explanation of the letters of reference in fig. 4.

A, auxiliary boiler; *B*, funnel; *C*, return pipe; *D*, inlet pipe; *F F*^{1}, *G*, *G*, radiating pipes; *H*, main steam pipe from front coupling to valve; *H*^{1}, main return steam pipe from rear to valve; *I*, steam trap; *L L*, rubber hose; *M M*, couplings; *R*, hose of dummy coupling; *S*, escape pipe; *W W*, manifolds of radiating system.

The steam enters through coupling *M* and hose *L* through pipe *H* to valve *U*, and supposing the disk *a* to be turned fully open (or with index plate at *O*), passing through radiating pipe *F* to manifold *W*, and so through pipes *G* and *G* to manifold *W* at rear end of car, and through pipe *F*^{1} to centre of car, entering valve *U* and passing out through pipe *H*^{1} to rear. Supposing disk *a* to be turned partly open or index plate showing any desired graduation between *S* and *O*, any desired amount of steam would pass from pipe *H* to radiating pipes in car, and the balance through pipe *H*^{1} to rear. Supposing left hand end of car to be rear end of train, coupling *M* is swung around and coupled to dummy coupling which is connected by hose *R* to pipe *S*, leading through roof at rear corner of car, allowing surplus steam to escape. At a proper place in each car a small steam gauge is attached for convenience.

When necessary to use auxiliary boiler *A*, fig. 4, disk *a* should be turned fully off, so that index plate is at *S*, then pipes *D* and *C* are in direct connection, through valve *U* with radiating pipes *F*^{1}, and *F* and pipe *D* forming an inlet pipe coming from top of boiler, and *C* a return pipe entering near bottom of boiler, thus allowing all water of condensation to return to boiler *A*.

This boiler *A* constitutes a hot well continually catching condensed water where cars are being heated from any other source, but should it become necessary to fill the boiler with cold water, a tee with valve, into which a funnel can be screwed, is placed on pipe *F*, directly under the middle seat of car, giving an opportunity to fill the boiler at any time when there is no pressure. On the bottom side of the boiler is a blow-off cock *V*.

Funnel *B* from auxiliary boiler is inclosed in iron case in side of car, the casing filled around funnel with asbestos plaster an inch in thickness. Door *K* under ash-pan swings down, permitting the fire to be dumped.

Fig. 1.

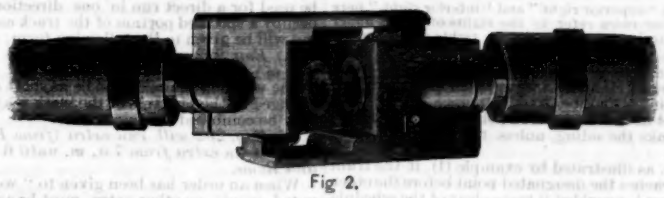


Fig 2.

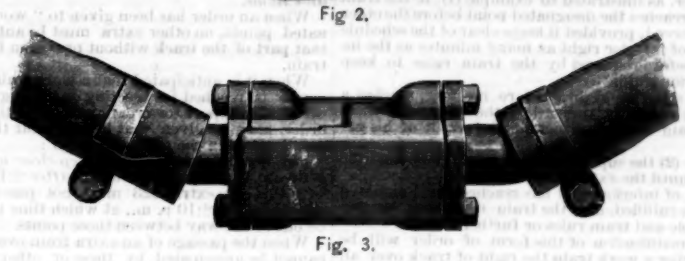


Fig. 3.

The Coupling.

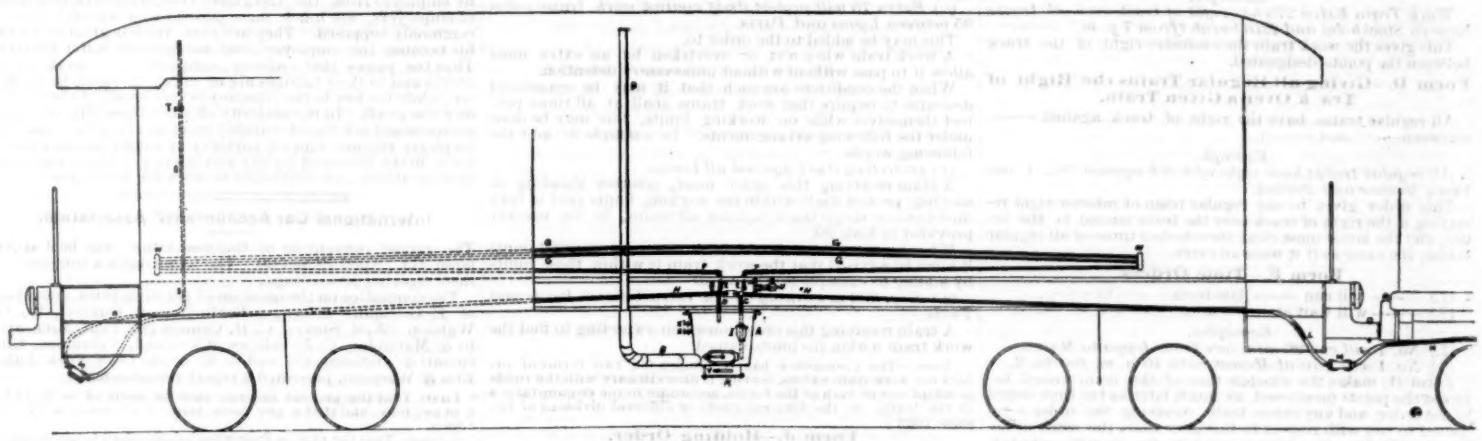


Fig. 4.—General View of Car.

THE SEWALL SYSTEM OF HEATING CARS.

It is claimed that the steam-trap *I* secures perfect drainage, so that by leaving the blow-off cock *V* open, no fire need be kept over night in the coldest weather, and the couplings when uncoupled are free from condensed water, so that the car when uncoupled for several hours or days at a time requires no care to prevent freezing in any climate.

Clemens Herschel on the Inter-state Law.

Mr. Clemens Herschel, a prominent Massachusetts civil engineer, and one of the railroad commissioners of that state in 1882 and 1883, writes to the *Springfield Republican*, giving his views on the Inter-state Commerce act. His experience as commissioner gives especial weight to his utterances.

Beginning with the assertion that this summary action of Congress "has, at a bound, established a centralized form of control over the railroads of the country, the like of which, for extent of territory and of interests covered, and for extreme form of centralization, may be sought for in vain elsewhere on the face of the earth," he goes on to say that the success of the best of the American state commissions is what has led people to put their faith in the scheme now being tried. These state commissions have, however, undergone a constant restrictive pressure from the decisions of the United States Courts, which from Munn against Illinois (94 U. S., 113), on the constitutionality of an act passed in 1871, through Chicago, Burlington & Quincy against Iowa (94 U. S., 155), and Peik against Chicago & Northwestern (94 U. S., 164) up to Wabash, St. Louis & Pacific against Illinois (118 U. S., 557), with fluctuating opinions as to the powers of a state to control railroad traffic, have finally culminated in the decision of October, 1886 (118 U. S., 557), "which virtually reversed the drift of previous decisions, permitting states to some extent to regulate inter-state commerce, and furnished the argument needed by those who desired to bring all inter-state railroads under the control of the federal government. It had come to this: To have practically no regulation for long-distance traffic, or to have Congress exercise it, and Congress took a sudden resolution and passed the present bill."

Mr. Herschel quotes from the address of C. F. Adams, Jr., in Boston, 1882, wherein was advocated a National board for the purposes of investigating, securing publicity and recommending legislation, and the prediction made that such a board composed of the right kind of men would preclude the necessity for crude and stringent laws, such as the average legislator loves to pass. The country could not wait, though, to move according to Mr. Adams' cautious plan and so we have the spectacle of the complete reversal of the position of the United States Supreme Court within five years, and the present law.

Mr. Herschel points out the necessity of the Commission's power to suspend the fourth section in cases where Canadian competition comes in as a thorn in the side, though such suspension merely because there is competition from water routes cannot by any means be regarded as always warrantable.

"The improvement of natural, and the construction of artificial, water-ways has long been recognized and advocated by able men, as the most effective, and yet a quiet, natural way, of regulating railroad rates. * * * * As a regulator of freight rates, a canal may exert a most potent effect, even though (passing to the extremes of argument), it do not carry a pound. It would suffice, that it *stood ready* to carry freight, at the same or at a shade lower rates than its more nimble competitor. Whence the familiar argument on the uselessness of canals, based on the annual returns of the statistician, which show how much more the railroads have carried during the year than did the canal, becomes fallacious. The old world learnt the lesson some years ago, and has been very active in the construction of internal water-routes. I have no fear that we will not in due time be equally awake, or that we shall willingly do without these greatest of cheapeners of raw materials and of food for the people."

Mr. Herschel thinks the present tendency is towards the weakening of state boards and possibly the substitution of United States district or subordinate boards to act in conjunction with the chief commissioners at Washington, and concludes his paper as follows: "The railroad problem, which certain people imagine to be a problem waiting for annihilation by solution, is a problem of life and of action. It will remain with us so long as railroads remain, ever taking on new features, ever presenting new difficulties for removal or for alleviation. Whatever faults the working of the Inter-state Commerce act may show in practice, there will be no escape from the necessity of some form of railroad regulation in the future, and a wise amendment of the act will have to take the place of a repeal; for this latter would be only a step toward a reenactment, to the manifest disarrangement of commerce and of manufactures pending such several radical changes."

Telegraphic Train Orders.

Below will be found the forms of train orders appended to the Time Convention Committee's report given last week. With the forms will be found explanations and recommendations, which render this portion of the report of as much interest as that part containing the rules proper:

FORMS OF TRAIN ORDERS.

Form A.—Fixing Meeting Point for Opposing Trains.

——— and ——— will meet at ———.

Examples.

No. 1 *and No.* 2 *will meet at Bombay.*
No. 1 *and* 2*d No.* 2 *will meet at Siam.*
No. 1 *and Extra* 95 *will meet at Hong Kong.*
Extra 652 *North and Extra* 231 *South will meet at Yokohama.*

Trains receiving this order will, with respect to each other, run to the designated point, and having arrived there will pass in the manner provided by the Rules.

Form B.—Authorizing a Train to Run Ahead of or Pass Another Train Running in the Same Direction.

(1.) ——— will pass ——— at ———.
(2.) ——— will run ahead of ———, from ——— (to———).

Examples.

(1.)—*No.* 1 *will pass No.* 3 *at Khartoum.*
(2.)—*No.* 4 *will run ahead of No.* 6 *from Bengal (to Madras).*

When under this order a train is to pass another, both trains will run according to rule to the designated point and there arrange for the rear train to pass promptly.

Form C.—Giving a Train of Inferior Right the Right of Track Against an Opposing Train of Superior Right.

—— has right of track against —— (——) to ——.

Examples.

(1.)—*No.* 2 *has right of track against No.* 1 (*Mecca*) *to Mirbat.*

(2.)—*Extra* 37 *has right of track against No.* 3 (*Natal*) *to Ratlam.*

[NOTE.—The terms "superior right" and "inferior right," here and elsewhere in these rules refer to the rights of trains under the time table and train rules, and not to rights under special orders.]

This order gives a train of inferior right the right of track against one of superior right, to a designated point, when a definite meeting point cannot be fixed.

If the trains meet at the designated point, the train of inferior right must take the siding, unless the rules or orders otherwise indicate.

Under this order, as illustrated by example (1), if the train of superior right reaches the designated point before the other arrives it may proceed, provided it keeps clear of the schedule time of the train of inferior right as many minutes as the inferior train was before required by the train rules to keep clear of the superior train.

If the train of superior right, before meeting, reaches a point beyond that named in the order, the conductor must stop the other train where it is met and inform it of his arrival.

Under example (2) the superior train cannot go beyond the designated point until the extra train arrives.

When the train of inferior right has reached the designated point, the order is fulfilled, and the train must then be governed by time-table and train rules or further orders.

The following modification of this form of order will be applicable for giving a work train the right of track over all other trains, in case of a wreck or break in the track.

Example.

Work Train Extra 275 *has right of track over all trains between Stockholm and Edinburgh* (*from* 7 *p. m.*) (——).

This gives the work train the exclusive right of the track between the points designated.

Form D.—Giving all Regular Trains the Right of Tra k Over a Given Train.

All regular trains have the right of track against —— (between—— and ——).

Example.

All regular trains have right of track against No. 1 (*between Moscow and Berlin*).

This order gives to any regular train of inferior right receiving it the right of track over the train named in the order, and the latter must clear the schedule times of all regular trains, the same as if it were an extra.

Form E.—Time Orders.

(1.) —— will run —— late from —— to ——.
(2.) —— will wait at —— until —— for ——.

Examples.

(1.) *No.* 1 *will run* 20 *min. late from Joppa to Mainz.*
(2.) *No.* 1 *will wait at Muscat until* 10 *a. m. for No.* 2.

Form (1) makes the schedule time of the train named, between the points mentioned, as much later as the time stated in the order, and any other train receiving the order is required to run with respect to this later time, the same as before required to run with respect to the regular schedule time. The time in the order should be such as can be easily added to the schedule time.

Under Form (2) the train of superior right must not pass the designated point before the time given unless the other train has arrived. The train of inferior right is required to run with respect to the time specified the same as before required to run with respect to the regular schedule time of the train of superior right.

Form F.—For Sections of Regular Trains.

—— will carry signals (——) to —— for ——.

Examples.

No. 1 *will carry signals* (*Astrakhan*) *to Cabul for Eng.* 85.

2d No. 1 *will carry signals* (*London*) *to Dover for Eng.* 90.

This may be modified as follows:

Engines 70, 85 *and* 90 *will run as* 1*st*, 2*d and* 3*d sections of No.* 1 (*London*) *to Dover.*

For discontinuing a section:

Eng. 85 *is discontinued as* (*second*) *section of No* 1 (*from Dover*).

If there are other sections following, add:

Other sections will change numbers accordingly.

The character of train for which signals are carried may be stated. Each section affected by the order must have copies, and must arrange signals accordingly.

Form G.—For Arranging a Schedule for a Special Train.

(1.) Eng. —— will run as special (——train), leaving —— on —— on the following schedule, and will have the right of track over all trains:

Leave ——.
——.
Arrive ——.

Example.

(1.) *Eng.* 77 *will run as special* (*passenger train*), *leaving Turin on Thursday, Feb.* 17, *on the following schedule, and will have the right of track over all trains:*

Leave Turin 11:30 *p. m.*
Pekin 12:25 *a. m.*
Canton 1:47 *a. m.*
Arrive Rome 2:22 *a m.*

Example (1) may be varied by specifying particular trains over which the special shall or shall not have right of track, and any train over which the special train is thus given the right of track must clear its time as many minutes as such train is required to clear the schedule time of a first-class train.

(2.) Eng. —— will run as special (—— train), leaving —— on —— with the rights of a —— class train (——), on the following schedule, which shall be for this train a supplement to time-table No. ——.

Leave ——.
——.
Arrive ——.

Example.

(2.) *Eng.* 75 *will run as special* (*passenger train*), *leaving Geneva, Thursday, Feb* 17, *with the rights of a* (*first*) *class train* (*east*) *on the following schedule, which shall be for this train a supplement to time-table No.* 10:

Leave Geneva 10 *a. m.*
Pekin 10:30 *a. m., passing No.* 12.
Canton 11 *a. m., meeting No.* 7.
Arrive Athens 11:30 *a m.*

Example (2) will be in each case a temporary supplement to the current time-table, and the designation of meeting and passing points is to be taken as the same as such designation by full-face type on the time-table, and the rules are to govern in the same way.

Form H.—Extra Trains.

—— will run extra from —— to ——.

Example.

(*a.*) *Eng.* 99 *will run extra from Berber to Gaza.*

A train receiving an order to run extra is not required to guard against opposing extras unless directed by order to do so, but must keep entirely clear of all regular trains as required by rule.

A "work train" is an extra for which the above form will be used for a direct run in one direction. The authority to occupy a specified portion of the track as an extra while working will be given in the following form:

(*b.*) *Eng.* 292 *will work as an extra from* (7 *a. m.*) (*until* 6 *p. m.*) (*or to-day*) *between Berne and Turin.*

The working limits should be as short as practicable, to be changed as the progress of the work may require. The above may be combined thus:

(*c.*) *Eng.* 292 *will run extra* (*from Berne*), *to Turin and work as an extra from* 7 *a. m. until* 6 *p. m. between Turin and Rome.*

When an order has been given to "work" between designated points, no other extra must be authorized to run over that part of the track without provision for passing the work train.

When it is anticipated that a work train may be where it cannot be reached for meeting or passing orders, it may be directed to report for orders at a given time and place, or an order may be given that it shall clear the track for a designated extra, in the following form:

(*d.*) *Work Train* 292 *will keep clear of Extra* 223, *south, between Antwerp and Brussels after* 2:10 *p. m.*

In this case extra 223 must not pass either of the points named before 2:10 p. m., at which time the work train must be out of the way between those points.

When the passage of an extra train over the working limits cannot be anticipated by these or other orders to the work train, an order must be given to such extra, to protect itself against the work train, in the following form:

(*e.*) *Extra* 76 *will protect itself against work train extra* 95 *between Lyons and Paris.*

This may be added to the order to.

A work train when met or overtrken by an extra must allow it to pass without without unnecessary detention.

When the conditions are such that it may be considered desirable to require that work trains shall at all times protect themselves while on working limits, this may be done under the following arrangements. To example (*b*) add the following words

(*f.*) *protecting itself against all trains.*

A train receiving this order must, whether standing or moving, protect itself within the working limits (and in both directions on single track) against all trains, in the manner provided in Rule 99.

When an extra receives orders to run over working limits it must be advised that the work train is within those limits by adding to example (*a*) the words

(*g.*) *Eng.* 292 *is working as an extra between Berne and Turin.*

A train receiving this order must run expecting to find the work train within the limits named.

[NOTE.—The Committee has recommended two forms of orders for work train extras, leaving it discretionary with the roads to adopt one or both of the forms, according to the circumstances of the traffic on the different roads or different divisions of the same road.]

Form J.—Holding Order.

Hold ——.

Examples.

(1.) *Hold No.* 2.
(2.) *Hold all trains* (*east*).

As any order for which "O. K." has been given and acknowledged operates as a holding order for the train to which it is addressed, this form will only be used in special cases, to hold trains until orders can be given, or for some other emergency. The reason for holding may be added, as "for orde s."

This order is not to be used for holding a train, while orders are given to other trains against it, which are not at the same time given to it in duplicate. It must be respected by conductors and enginemen of trains thereby directed to be held as if addressed to them. Conductors when informed of the order, must sign for it, and their signatures must be sent and "complete" obtained.

When a train has been so held it must not go until the order to hold is annulled, or an order is given in the form "—— may go." This must be addressed to the person or persons to whom the order to hold was addressed, and must be delivered in the same manner.

Form K.—Annulling a Schedule Train.

—— of —— is annulled.

Examples.

(1.) *No.* 1 *of Feb.* 29*th is annulled.*
(2.) *No.* 3 *due to leave Naples Saturday, Feb.* 29*th, is annulled.*

Adding "*from* (*Alaska*)," or "*between* (*Alaska*) *and* (*Halifax*)," when appropriate.

This order takes away all rights of the train annulled and authorizes any train or person receiving it to use the track as if the train annulled were not on the time-table.

If a train is annulled to a point named, its rights beyond that point remain unaffected.

The train dispatcher may direct any operator to omit repeating back an order annulling a train, until he has occasion to deliver it.

When a train has been annulled it must not be again restored under its original number by special order.

Form L.—Annulling or Superseding an Order.

"Order No.—— is annulled."

This will recite the full order annulled, and will be numbered, transmitted and signed for as other orders.

If the order which is annuled has not been delivered to a train, the annulling order will not repeat it, but will be in the following form:

Order No.——*for trains*——*and*——*is annulled*, and will be addressed to the operator, who will destroy all copies but his own, and write on it

Annulled by order No.——.

An order superseding another may be given, adding "*this supersedes order No.*——," *or adding* "*instead of*——."

Example.

No. 1 *and No.* 2 *will meet at Sparta instead of at Thebes.*

An order that has been annulled or superseded must not be again restored by special order under its original number.

In the address of an order annulling or superseding another order, the train first named must be that to which rights were given by the order annulled or superseded, and when the order is not transmitted simultaneously to all concerned, it must be first sent to the point at which that train is to receive it.

The Committee recommends for "31" order blanks, white paper with blank space 4 by 6¾ in. for the body of the message and a lined and ruled space below, 3 by 6¾ in., for the signatures. For "19" orders a similar sheet of green paper is recommended, but with no space for signatures. The clearance card recommended is manilla color and is endorsed at the bottom, "Conductor MUST SEE that the number of HIS TRAIN is entered in the above form correctly."

Perquisites.

In Mr. Kirkman's "The Handling of Railway Supplies," now in press, the following proper comment is made on the use that employés of corporations make of the stationery of their employers. He should, however, have added advice to the employers to make known to all clerks to just what extent they are at liberty to use company stationery. The amount involved is trivial, but when the liberty to use is not distinctly stated most clerks assume it. Some conscientiously refrain, and a few use such supplies surreptitiously and thereby cultivate a dangerous state of mind.

"The universality of this practice excuses and justifies it. It has its counter-balancing considerations. The practice is much more common with the employés of private individuals than with those of corporations. Everywhere the use of the paper, envelopes and stationery of the employers is recognized as a perquisite or right of employés. Abstractedly considered, the practice is perhaps wrong. As a matter of fact, the employer does not suffer at all, or except in the most minute sense. The use of his stationery advertises him while it perhaps assists those under him to eke out a slender income. So long as it is restricted within the limits named, no harm is done. In all other departments, however, the property of employers is, and should be, scrupulously regarded. When it is not, the act is regarded as indefensible. This is always the case in reference to the appropriation of property for purposes of personal gain. The selling of a thing that belongs to another, however trifling, is considered wrong, even by those not so scrupulous in other matters. The benefits that are derived by employés from the recognized concessions and courtesies of employers, are much more general and valuable than is commonly supposed. They are none the less great or valuable because the employer does not always suffer thereby. Thus the passes that railway companies give to their employés and to their families are of enormous value to the latter, while the loss to the company is very small, if they suffer any loss at all. In the majority of cases those who use these passes would not travel without them and in other cases the employer recoups himself partially or wholly in other directions, in the increased loyalty and interest of his servants and in their ability and disposition to work for less wages."

International Car-Accountants' Association.

The annual convention of this association was held at Atlanta, Ga., April 19 and 20. The following is a summary of their reported proceedings:

The committee on the question of per diem rates, consisting of E. G. Squire (Chicago, Burlington & Quincy), W. G. Wattson (West Shore), C. H. Cannon (St. Paul, Minneapolis & Manitoba), C. J. Fellows (Cleveland, Columbus, Cincinnati & Indianapolis), and G. K. Cooke (New York, Lake Erie & Western), presented a report recommending

First—That the present mileage rate be reduced to one half cent per mile, and that a per diem rate of 15 cents a day be added.

Second—That the rate on four-wheeled cars shall be one-quarter cent per mile and 7½ cents per day.

Third—That the per diem charge begin on the date of delivery, but no per diem charge shall be paid on any cars received and delivered on the same date.

Fourth—Days to be counted from one date to another, *i. e.*, a car received April 1 and delivered on April 10, nine days.

Fifth—Line cars shall not be subject to per diem charge except on roads not in the Line. When desirable, arrangements can be made with Line managers to hold Line cars on any road exempt from the per diem charge.

Sixth—Per diem rate not to be allowed on cars of private car companies.

Seventh—Per diem on cars switched by one road for another for the purpose of receiving or discharging lading shall be paid by the road for which the switching is done.

Eighth—Per diem should be paid on cars in shops and on cars destroyed until date of notice to owners authorizing bill for settlement.

Ninth—The adoption of a junction report to owners of foreign cars which shall show the numbers of cars delivered at connections, with date of receipt and the number of days for which the per diem rate will be allowed.

This report was taken up section by section. Sections 1, 2, 3 and 4 elicited little discussion. Section 5 was objected to by a few members. The sixth section elicited a strong sentiment against private owners' cars and a general disposition to show them as little favor as possible. The vote on the adoption of this section was 36 to 9. Sections 7 and 8 were adopted unanimously. There was considerable discussion over the ninth, there being quite a diversity of opinion as to the proper way to keep per diem records, but the section was finally adopted as it stands. The report was then adopted as a whole.

A committee to bring this and other matters before the General Time Convention was appointed, consisting of Messrs. Hoyle, Blakeslee, Wattson, Cooke, Squire, Fellows and Connor.

The committee upon a cipher to use in tracing cars made a partial report, but at their request were continued for three months.

The next meeting will be June 19, 1888, unless sooner called by the president. This latter proviso was added on the recommendation of Mr. Wattson, who said the general managers were likely to indorse the convention's action concerning per diem rates before the close of this year, and that in that case a meeting of the association would be necessary previous to putting in effect so important a change.

The Average English Passenger Train.

The following figures as to the average English passenger train are taken from the figures given in the British Board of Trade Reports as to trains that have been in accidents. Accidents are, of course, liable to happen to any train whether it is composed of two or of twenty cars, and therefore these figures should be a fair average. Three kinds of trains are given in the list. "Main line," or through trains, are chiefly fast express trains, running fully 40 miles per hour, including stops. "Excursion trains" are run at low fares during the summer to seaside and summer resorts. These trains are usually heavy and well filled with passengers, and little baggage is carried. The branch trains appear to carry more passengers than the main line trains, though there is little difference in the number of cars. The greater quantity of baggage, express matter and mails carried by the main line trains is probably the cause of this difference.

The list is compiled from particulars of 20 trains. The smallest number of seats in any one train was 154 and the

largest number 968. The smallest number of cars (four-wheeled) in any train was 5 and the largest 23. Of the 7 branch trains, 3 were drawn by tender engines and 4 by tank engines. Three of the main line trains were drawn by 2 engines, making double headers. These trains consisted of 11, 10 and 8.5 cars with trucks, reckoning two rigid wheel base cars as equal to one car with trucks. In the following table double headers have been treated as two trains, and the figures are per engine:

AVERAGE ENGLISH TRAINS.

	Kind of train. Main line.	Excursion.	Branch.
Average weight:	Lbs.	Lbs.	Lbs.
Engine	92,970	78,400	114,240
Tender	71,680	62,720	
Cars	224,000	313,600	201,600
Total	388,640	454,720	315,840
No. seats	217	794	366
No. cars rigid wheel base	5.83	17.5	7.42
No. cars with trucks	2.25	...	1.42
Total	8.08	17.5	8.84
Equivalent No. cars with trucks	5.16	8.75	5.13

It will be seen that the average number of cars does not differ materially from that here, where a division of the passenger car mileage by the passenger engine mileage will generally give a quotient of about 5, showing that to be the average number of cars in a train. It must, however, be borne in mind that the weight of trains in England is much influenced by the season, the passenger receipts for the best week in the year being, on most lines, 2½ times those for the worst week. The passenger receipts are generally at a minimum about the end of February and gradually rise to a maximum in the last week of July. This great variation is hardly known here, but, of course, has an important effect on the conduct of English passenger traffic, as arrangements must be made for the maximum rather than the average traffic, and it is not uncommon to find an engine that has been hauling 10 sparsely filled "carriages" all winter called upon to draw 20 cars crammed full of passengers all summer. The engine has therefore to be designed so as to handle easily the maximum rather than the average load.

Master Car-Builders' Club, New York.

HEATING, LIGHTING AND VENTILATION OF PASSENGER CARS.

The regular meeting was held April 21, at the rooms of the Club, 113 Liberty street, New York.

The subject for the evening was on the Lighting and Ventilation of Cars, and was opened by Mr. DIXON, of the Pintsch Company, who gave particulars concerning that company's system, which is already well known to the readers of the *Railroad Gazette*.

Ventilation was next taken up and a model of Mr. John M. Finerty's ventilating device was exhibited. It is simply a connecting rod enabling a man at the end of a car to open all the over-head ventilators at once.

Mr. W. T. TAGGART, of the Standard Car Heating and Ventilating Company, of Pittsburgh, showed a sketch of the heating apparatus of that company, and gave a description which cannot be intelligibly reported without drawings, but which was to the effect that hot air and steam are both used, so that both ventilation and heating are provided for; and especially that in mild weather the apparatus is as readily controllable as in the depth of winter; the fire-box (under the car) is 10 inches above the rail. All the pipes are arranged so that water from condensation will always run back to the boiler.

Mr. BELL: You do not claim for this that it is a special preventive of accident or fire in case of derailment, do you?

Mr. TAGGART: Positively, sir; by actual tests.

Mr. BELL: Suppose it should go off a bridge 50 or 100 ft., what becomes of the fire amid the wreck when the train is at the bottom of the abyss?

Mr. TAGGART: We extinguish the fire the same way we would in case of derailment. We have a weight attached which is sure to act and extinguish the fire. The cost of fitting a car is $300, the railroad company to do all the sheet iron work. We furnish a man to superintend the construction.

Mr. BELL explained the nature of his safety casing for car-heaters, which cannot be described here without drawings. It has a gravity device for locking up the fire in case of derailment, etc.

Mr. M. B. LOONIE described the Hurly apparatus, the chief characteristic of which is a metallic coupling, suitable either for steam or hot air. It consists principally of two ball-and-socket joints and a telescope joint (fitted with a coil spring) between them. It is inclosed in a non-conducting flexible jacket, kept in place by an interior coil spring, such as is used in rubber vacuum brake hose. In case of train breaking in two the coupling automatically detaches and shuts off steam at the engine, at the same time giving a warning signal to the engineman.

Mr. WILDER: I am free to confess that I have joined the grand army of cranks. I have a heating device. We have tried it and find that it works very well, and I hope we shall have a train equipped in the course of another week, so that we can demonstrate what we can do. It is desirable to retain the present systems of pipes in the cars and still heat from the engine, so as to avoid the waste of throwing away so much expensive apparatus. I think I have accomplished this, but have no drawing here.

Mr. MARTIN (Martin Anti-fire Heater Co.), referring to criticisms, said: We do not carry over 5 or 6 lbs. pressure, and in ordinary weather not over 3, and I have seen the train running between Boston and Springfield during the winter when the gauge in the car indicated less than a single pound, and yet the temperature was 68 to 70. You may heat a car with a heater in the car, but it absorbs the atmosphere and also gives out more or less gas; but with the free ventilation of the continuous system you have a much better atmosphere.

In case a coupler comes apart, we instantly have all the steam escape under the platform. My object has been, instead of automatically closing steam in a car, to discharge it instantly in case of accident. An auxiliary heater can be used, if desired, and it can be instantly lighted to keep the condensed water warm during the time a car is cut off from the engine; but actual exprience proves to us that railroads do not want that. They say: "We will not have a stove in or about the cars; we do not need it; we are able to run for one hour and keep warm after the engine is cut off." On the Long Island road they had an engine under repairs, and they heated her train and sent it out on its trip and brought it back with another engine and the cars still remained comfortable.

(Replying to Mr. Bell.) We carry two rows of 2 inch pipe on each side of the car and have short spurs under the seats; there are from 260 to 270 ft. of pipe in a car.

(Replying to Mr. C. A. Smith.) I have been heating 5 cars on the New York Central. There are 7 cars together on the fast train running from Boston to New York. We have not heated more than 7 cars, simply because the roads have thought that that was sufficient to test it. The Boston & Albany are now fitting up cars, and they will get 10 or 12 together as soon as possible, and see what effect that number has on the engine. The roads that we are doing business with have become friends of steam heating after they have actually tried it.

Mr. D RANCOUR exhibited a model of a device for extinguishing fire in car stoves or heaters instantaneously and automatically in case of accident. The overturning, partial overturning or telescoping of cars, from motion obtained in no other way except in case of accident, causes a ball or weight to be displaced from its otherwise quiet seat, which, falling, is conducted to a lever so constructed and placed in connection with a valve in a reservoir that the valve is instantly opened, letting water into the fire. The ball is unseated at an angle of 45°. The jarring of the car in coupling cannot unseat it. Water is the best agent that can be used to extinguish fires. Carbonic acid gas can be used, but is more expensive and not so effective.

Mr. A. COTE exhibited his coupling for steam heating, which, however, cannot be explained here without engravings.

After some further remarks by Mr. Bell, in which he described his experience in introducing the Bell ventilator on various railroads, the meeting adjourned.

America and the English Iron Trade.

Under this head the London *Economist* states that the late revival in the English iron trade "is largely if not exclusively due to an increased demand from the United States, which set in during the latter part of 1886." During the last six months ending with March the English exports have been 1,775,547 tons, against 1,440,802 tons for the same period in 1885-86, showing an increase of about 335,000 in six months, all of which it asserts has come to this country.

It is complained that the demand from this country is of such an uncertain and spasmodic character as to be a source of danger to the trade; the total exports to this country having been as below for years of depression and expansion in tons of 2,240 lbs.:

1868.	1871	1878.	1880.	1885.	1886.
562,368	1,036,829	157,418	1,358,136	397,613	812,544

In the mean time our production has increased, according to the *Economist*, as shown below in gross tons:

1871.	1873.	1879.	1882.
1,706,793	2,560,963	2,741,853	4,023,323
1883.	**1884.**	**1885.**	**1886.**
4,595,510	4,097,868	4,044,526	5,084,513

During the month of March we were producing at the rate of 6½ million tons, and it is probably this larger production of our furnaces that accounts for the economic anomoly of a decrease in price in England, coupled with an increased demand, as is shown by the statements made by *Iron* in its review of a March iron market, viz.: The increase in the tonnage exported last month, for instance, was equal to 34.3 per cent., but the value showed an increase of only 11.6 per cent. This is a matter of great value to this country, as in 1880 and 1881 pig iron sold for $40 to $41, while now it seems disinclined to go above $20

TECHNICAL.

Railroads in Persia.

Since Russia has built the Trans-Caspian Railroad, the possibilities of a railroad through Persia from Rescht on the Caspian, through Teheran and Ispahan to Bushire, on the Persian Gulf, have attracted the thoughts of European capitalists, and now the German government has appointed a permanent consul, and it has been proposed to build a short road with German capital, the Persian government being asked to guarantee 5 per cent. interest and a 2 per cent. sinking fund on a capital of 120,000,000 marks, or $40,000,000, with control of the custom houses, freedom from taxation, power to work government mines, etc.

The negotiations are not yet completed, as the Persian officials are said to wish to exact too much for granting the concession.

Laying Concrete Under Water.

Mr. J. C. Goodridge, of New York, has recently patented a method of laying concrete under water. The concrete is mixed and placed in paper bags of convenient size, holding from one to five or more cubic feet. These bags are then slid down a properly directed incline into place. During the downward passage of the bag the paper becomes saturated with water, and the moment the bag comes in contact with the bottom, or the material already laid, it bursts from the change in shape of its plastic contents, and the béton or concrete is deposited in place in its most efficient condition, and ready to unite with the contents of preceding or succeeding bags to form a single monolithic mass.

It is claimed that by this method, the constituents of the concrete cannot be separated or partially washed away during the descent through the water due to the well-known principle that bodies of different sizes, though of the same specific gravity, fall through liquids at different rates of speed. Consequently when concrete falls through the water, the largest stones are deposited first, the next smaller next, and so on until the cement is deposited near the top. Last of all, the various impurities held in suspension by the water are deposited, which may at the end of a day's labor cover the work with a slippery, slimy mass several inches thick, known as "laitence," a mass without adhesion or cohesion, which prevents all bond between the layers, and may subsequently be washed away by the action of water, so as to endanger the structure. In short, unless the concrete is protected during its passage through the water, all skill in proportioning its ingredients, or care in incorporating them is rendered abortive. Experiment has shown that but a very slight fall through water, even less than one foot, will do this.

Various methods have been tried to overcome this well-recognized difficulty, among which may be mentioned the tremie or skip. This requires powerful mechanical appliances to lift and move it, and the first charge is not only lost, but lies in the place to be filled as an inert mass. Boxes of various patterns, generally with gates at the bottom, have been used; but here the box must be as far above the bottom when emptied as at least half the width of the gates, and thus wash is not entirely avoided. Bags formed of various kinds of cloth have also been tried; but these do not lie in close apposition to each other, the interstices are large and numerous, and they remain a series of separate blocks, not combined to form a monolithic structure, as is most desirable in submarine construction, where the stability of the blocks against the action of waves and currents depends upon their size. The matter of leakage, oftentimes of great importance, is very imperfectly prevented by this process, while the employment of a diver is necessary.

Aluminium.

Dr. Kleiner, of Zurich (Switzerland), has invented a new process for obtaining metallic aluminium, which is thus described in *Engineering*: The entire operation only occupies from two to three hours, and is effected by a steam engine, a dynamo and a hearth or melting vessel. These appliances divorce the aluminium from the elements with which it is combined in the ore, and by means of an electric current produce it in lumps, which vary in size from a marrow-fat pea to a small potato. In the Cowles aluminium furnace the current is merely a source of heat, and serves to raise the aluminium ore (corundum), together with the copper and the carbon, by which it is surrounded, to such a temperature that the oxygen in the ore combines with the carbon, and the aluminium alloys itself with the copper. In the Kleiner process it is the chemical power of the current which is principally brought into play, the metal being extracted by electrolysis at a low temperature. At the same time there is sufficient heat developed to fuse the ore, and thus bring it into a fluid condition, which is an essential condition of a material before it can be electrolyzed. As the substance employed melts at a low heat it rapidly attains the fluid state and becomes a conductor, and after this is arrived at there is little or no further rise of temperature, as the comparatively large area of the bath offers but small resistance to the passage of the current, and hence after the preliminary operation is complete the action becomes mainly chemical.

The ore employed is cryolite, a double fluoride of sodium and aluminium. This is ground to a fine powder, and under the action of the current has its aluminium removed, leaving a double fluoride of sodium, which is soluble in water. After the process has been carried as far as is commercially economical, the slag is allowed to cool, and is then broken up and washed. The metal comes out in lumps, the soda salt is dissolved, and can be saved for conversion into caustic soda, while the unreduced ore, which is insoluble, is dried and returned to the bath. It will be seen from this that the two elements of the process are the ore, and the power required to drive the dynamo. As aluminium enters into very firm union with other bodies it requires the expenditure of a large amount of energy to break up the connection, the theoretical result attained by an amount of electric energy represented by one horse-power per hour, being 3½ grammes ($\frac{1}{130}$ lb.). Of course, the full efficiency cannot be obtained in practice, but in an experiment made in London by Dr. John Hopkinson, F.R.S., it appears that a dynamo machine giving 100 electric horse-power, and working twenty hours per day, would produce 80 lbs of pure aluminium per week of six days.

It is stated that the process is about to be tried on a large scale, and that experimental works are to be erected in England, calculated to turn out 200 lbs. of aluminium per week. The addition of aluminium to iron or copper produces very valuable alloys, and hence even if the metal is too expensive to be used by itself, it will always be in demand as an alloy. It is already used with iron to form the Mitis castings, and it is claimed that the addition of aluminium to steel will insure sound castings. The strength, resistance to wear and fine appearance of aluminium bronze are well known.

Testing Eyesight of Locomotive Engineers.

The Superintendent of Motive Power of a large English railway gives the following account of the method used on his line to test the sight of locomotive runners and firemen.

"On the railway I am connected with the eyesight of all drivers and firemen is tested periodically, the method adopted being as follows: Cards with sixteen to eighteen black spots ¾ in. square, and placed irregularly, are exposed in full daylight 15 ft. from the man under examination. He is required to count the spots with each eye separately, and if he can do so accurately his sight is considered right for distance. At the same distance—15 ft.—he is required to distinguish with each eye separately, red, blue, green, yellow. A bundle of colored wools is then placed before him, and any color, say red, is selected, and he is told to pick out of the bundle colors to match it. He is tried in a similar manner with green and blue. The black spots, ¾ in. square, correspond at a distance of 15 ft. with a surface 2 ft. square at 600 yards.

"Every care is taken to test the men fairly, and in many cases men who had doubtful sight have been tested over and over again, and if there was still any doubt they have been sent to an eminent oculist for his opinion. Many men can distinguish colors perfectly well, but are ignorant of their names; but if you put a decided red-colored wool into a man's hand, and tell him to select a similar color from a bundle of wools, and he selects a bright green and tells you that they are both the same color, it must be admitted that such a man would be color blind, at any rate for red and green, and therefore unfit to have charge of a locomotive engine. I have known several instances of this kind.

"I have found that about 97 per cent. of the men examined had good sight. This may be accounted for by the fact that all drivers have their sight tested when joining the service, and any lads with defective sight are not employed in that capacity."

Railroad Building in China.

The only railway in China, the Kaiping coal railway, is being extended 21 miles to the Pehtang River. Some coal cars are being built in the United States for this line.

Basic Steel Patents.

Judge Stowe, of Pittsburgh, filed an opinion last week asigning to the Bessemer Steel Co., of Philadelphia, some 42 patents and re-issues valued by Jacob Reese, the inventor, at $200,000,000.

The decision was on the suit brought five years ago against Jacob Reese, of Pittsbugh, Pa., to compel the transfer of a number of patents relating to his basic steel process, which the plaintiff company claimed Mr. Reese had sold to it three years before for $5,000 a year during the life of the patents—fourteen years. It appears that by the agreement made at that time the patents were specified, and these were transferred. Subsequently the Philadelphia people learned that Reese had other patents relating to the same matter, for which they brought suit in 1882. The whole contention was as to the wording of the contract made in 1879. The plaintiff company during the pendency of this suit paid the Thomas Gilchrist Company of England, $275,000 for a number of patents, which the United States Patent Office declared valueless, as they were all covered by prior issues made to Mr. Reese. The suit was then prosecuted under the 1879 agreement. It is said that could Mr. Reese redispose of these patents at present he could realize on them at least $100,000 a year. The case will probably be argued before the Supreme Court next October. The royalty continues until 1893. The Bessemer Steel Co. is composed of all the manufacturers of Bessemer steel in the United States, and this decision gives them absolute control of all patents relating to the same. Andrew Carnegie and other well-known Pittsburgh men are interested in the company.

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The following facts concerning the number of power brakes supplied for service up to the present time, by some of the makers who will compete at the Burlington trials, are from information received within a few days, and are doubtless very accurate.

As is well-known, the Westinghouse is used much more extensively than any other. The total number of its brakes in use is, on engines, 19,217, and on cars, 124,604. Of these there are equipped in the United States and South America 12,919 engines and 77,425 cars, of which 49,131 are freight cars. Probably 75 per cent. of the engines reported have driver brakes. The freight brake is in use on 41 lines, and the names of 14 are given as having in use 500 or more sets, 12 of these lines being in the United States. The extended application of the Westinghouse brake to freight cars began in 1883, and the company has been supplying them since to the extent of its capacity, and now has unfilled orders for upward of 8,000 sets.

The American Brake Company has 2,162 engine brakes in use on 300 roads, and 5,005 freight cars are now equipped with its brake. It has been in use since 1880 on the St. Louis & San Francisco.

The Carpenter brake has been in use, on passenger trains only, since 1882, and nearly 8,000 cars and 4,000 locomotives are equipped with it. Of these cars about 500 are freight to be run in passenger trains. The form of this brake to be tried at Burlington will differ somewhat from that heretofore in use. It is in use in Spain, Austro-Hungary, Russia, Sweden and Germany. It has not been heretofore tried in this country.

The Rote brake has been in actual use on 10 cars on the New York, Pennsylvania & Ohio. This is its only application aside from the 50 cars run in the tests at Burlington last year.

The Hanscom brake has been run about 10 months on the North Pacific Coast Railroad, on five cars. The train mileage made, was about 39,000, and on a down grade of 121.4 ft. per mile, these brakes on five cars "have easily held a train of 10 cars and an engine, there being no brakes on engine or tender."

No recent data have been received from the other makers who have entered for competition at Burlington.

The alarm about the effect on business of the Interstate law is much less acute than it was a week ago. The purpose of the Commission to go slowly, and to refuse to be forced, is so apparent that public confidence in the stability of existing arrangements has been greatly strengthened. People are becoming more and more convinced, too, that the general prosperity of the country is real and not fictitious or transitory. There was much inclination to attribute the unusual volume of business done by the railroads in March to eagerness on the part of shippers to anticipate the effects of the new rates and classification, and, doubtless, this was an important influence. But there is good reason to think that the increase in net earnings of April of this year, as compared with last April, will be as great as the March increase. It is too soon to judge, however, how much of this increase is due to higher rates and to the abolition of passes and commissions, and how much is due to a larger volume of business.

On another page will be found a comprehensive résumé of the present condition of electric railroad construction in the United States. Hardly any one who has not made a special study of the subject knows the rapidity and extent of the development of this means of transportation, and Mr. Martin's thorough work will enlighten a good many people. It is evident that statistics for knowing accurately the cost of transportation by electric motors, and facts as to the real and supposed obstacles to their use, will accumulate fast. The question, so far as city roads are concerned, will generally be between cable traction and electric motors, both of which have special advantages under special conditions.

Elsewhere is given a brief abstract of a portion of the report of the Massachussetts Railroad Commissioners on the fall of the Bussey bridge, which is all that has reached us up to the time of going to press. The conclusion that the bridge fell from its own defects of design and construction was certain from the first. That a management so enlightened and so liberal as that of the Boston & Providence should have attempted to build and maintain bridges without a competent engineer is astonishing. In the light of the facts, a law such as is recommended by the Commission, prescribing stated and competent inspection, seems necessary.

Expressions in some quarters seem to indicate that the separating of the instructions to train and station men, so that each individual can find and refer to his rules without troubling himself with those which concern other grades or departments exclusively, a proposition which has been advocated in the *Railroad Gazette*, is deemed dangerous and in the wrong direction; that not only is it desirable to have switch-tenders and brakemen fully understand and appreciate enginemen's and station agents' rules, but that it is an absolute necessity that this be required. And the plans suggested in these columns are, presumably, regarded as tending toward the repression of intelligence rather than to its encouragement.

Such is not the case, however. The *Railroad Gazette's* position is founded on things as it finds them; nothing would please it better than to see every railroad position filled by a person who could intelligently recite from memory the whole body of the rules and principles governing the service; but the practical state of the case is, that the roads have been for years trying to have "all employés understand all the rules," but have constantly failed in the attempt; every week it transpires that some one, by reason of an "accident" or otherwise, is not only ignorant of the rules in general, but even of those which vitally concern himself and his own actions; so that nothing can be plainer than that the process of *teaching* the rules has been very imperfectly performed, whatever may be said about the intrinsic value of the rules themselves. Inquiry concerning the cause of this state of things shows unmistakably that the reason information is not digested (or even swallowed) is that it is given out in too large doses and with too little care. Now, in dividing the mass with a view to getting it into usable shape, the first and most natural move is to arrange the various parts in the order of their degree of importance to the party who is expected to make use of them; howsoever much it may be desired to have a man know of the duties of his fellow-servants, it is only reasonable to explain to him the *relative* value of the various parts. To tell a brakeman how to act as conductor is well and proper, and should be attended to in due time; but be sure and tell him how to be a brakeman first. To have this latter point well taught (not merely *told*) is better than the adding a dozen other things and trusting to the man's finding them out and giving them their due weight unaided.

The May number of *Harper's Magazine* contains a light and pleasant "social study," by Prof. R. S. Ely, on the nature and significance of corporations, written in a much better spirit than his previous articles upon railroads. Its reference to the Suez Canal as a religious project of the Saint-Simonian Socialists, with whom M. De Lesseps was for a time associated, recalls the fact that one of the largest American railroad enterprises was first brought to public attention in a spirit of almost religious earnestness. Both it and the great canal at last proved successful, but at the cost of thousands of poor fellah's lives in the one case, and at great loss to the little properties of many small investors in the other. The lesson which we would recommend to the new school of writers, of which the Professor is one, is the greater demand for all the ordinary, working qualities of manhood on the part of those whose minds are filled with noble purposes and high aims.

When it is asserted that the moral element is at its minimum in corporations, a further inquiry may be possible as to what the "moral element" includes. If it includes a sense of duty, of sincerity as exhibited in thoroughly good work, the statement may be denied. A corporation does not consist of a mere board of directors, representing "soulless capital," but of a corps of officers and subordinates, among whom what may be called the professional spirit, one of the best products of trained earnestness, is exhibited to a degree not found in private and less important enterprises. No doubt a strong soil produces vigorous weeds, but this is only an evidence of its fertility. The corporation as a training school of the practical and essential virtues has not yet had its full opportunity, nor have its social results been appreciated at their substantial value. It has been the school of the professional spirit in the business world, as private enterprise has been the school of individual independence.

It will be understood, of course, that these remarks view the corporation as a social and not a legal creature, assuming it to be all that it really is found to be in the business world, not in mere law books. One of the needed public reforms is a cessation of high-toned criticism, and an humble study of the soul of goodness in things often supposed to be necessary evils; and we heartily commend the professor's article as an exhibition of at least a good state of mind, something which at this critical period is more valuable and more worthy of respect than mere originality of conception.

IMPROVEMENTS IN ROLLING STOCK.

The suggestion that spring buffers should be adopted to lessen the blows on couplers appears to be received with much favor in various influential quarters, and it appears that this method of dividing the work between the coupler and the buffers will be of advantage both to link and vertical plane couplers.

The division of labor is an old and sound doctrine of political economy, and often applies to mechanical matters. Experience has certainly shown that in endeavoring to make a coupler that will both hold the cars together and keep them apart, we have somewhat overtaxed the endurance of any device of moderate weight and cost. If the present styles of vertical plane couplers are to be made to stand the assaults of 60,000-lb. cars, the coupler must be strengthened in some way. If the various parts are further enlarged, they will not interchange with existing couplers. The use of the best possible material enhances the price and does not altogether overcome the difficulty. There remains, therefore, only one remedy, which is obviously to diminish the work the coupler has to perform. All couplers, undoubtedly, suffer more from the blows in buffing than from the draft strains in pulling, and therefore a system of spring or elastic buffers taking the place of the present deadwoods will not only relieve both automatic and ordinary couplers of the most trying part of their work, the heavy blows in buffing, but will also relieve the framing of the car. If the buffers are placed in line with the sills, the strain will be fairly transmitted along the centre of the sills, where the car is well able to stand the strain. The present arrangement of taking the buffing strain on the draw timbers below the sills is very unmechanical, and it is not surprising that so many draw-timbers are knocked off. With spring buffers placed in line with the sills, the draw-timbers will simply have to resist the draft strain. The probability of lessened repairs are obvious. Some experience will, of course, be necessary before the right proportions are obtained, and the liability of buffer spindles to bend and droop in their guides will have to be carefully guarded against.

The use of spring buffers, automatic couplers, and automatic electric air-brakes on freight trains seem probabilities of the near future, and will all tend to increase the first cost of cars and render necessary better workmanship in the first instance, and greater skill and care in maintaining freight cars in good working condition.

It can hardly be doubted that when cars are equipped with these appliances, freight trains will be run at higher speeds, while the use of a proper system of interlocked signals will render unnecessary the present practice of slackening speed at every yard and crossing, etc. The higher speed will create a demand for better journal boxes, one of the most important and essential parts of a car, which has

hitherto received but slight attention. It is no credit to the mechanical department of a railroad that few freight trains can run for any distance without several boxes being hot, and some on fire, notwithstanding periodical and frequent oiling. It is perfectly possible to construct, at a small cost, journal boxes that are practically oil-tight. Instances have come within the writer's notice of railroads where a hot box was practically unknown, though no box was oiled oftener than once a month. At present inventors appear to be devoting considerable attention to devising methods of lighting and heating passenger cars, but as there seems a chance that this field will be overcrowded, it is but right that they should bear in mind that the lucky possessor of a good, simple and cheap oil-tight journal-box will, in all probability, find a considerable demand for such an article in the near future.

It is somewhat singular that the whole tide of invention seems at the present time to be flowing so strongly in the direction of improving passenger and freight cars, while locomotives are severely let alone. The last few months has witnessed the development of several radically new systems of continuous brakes, an innumerable number of methods of lighting and heating passenger cars, some efforts to improve car seats, and the gradual improvement and development of many highly ingenious and meritorious car couplers, but the development of the locomotive seems almost at a standstill. Every builder of locomotives returns "No" as the answer when he is asked if he has anything new in locomotives. The Strong locomotive is certainly a new departure in many respects, but it was devised, as regards its main features, by Mr. Strong several years ago, and can therefore hardly be called an invention of the last two years.

The adaptation of the compound system to the peculiar needs of a locomotive is a problem which has received attention in nearly every country in the civilized world but our own. The results have been so uniformly favorable that the prevailing apathy on the question is somewhat singular, but with the exception of a brief and inconclusive experiment on one road here, no effort appears to have been made to test the merits or demerits of compound locomotives in this country. This is the more surprising, as the increasing use of higher boiler pressures permits the compound system to be tried under favorable circumstances.

One of the past Presidents of the Master Mechanics' Association, Mr. Barnett, has drawn up a most excellent and exhaustive list of important subjects for discussion for those interested in running and maintaining locomotives. A thorough and conclusive investigation of the points connected with these subjects would be equivalent to many improvements in locomotive practice, and it is to be hoped that the next convention will see each member come prepared to give his quota of experience and facts to aid in solving the problem proposed by Mr. Barnett. Most of them have never been adequately discussed and few have received a tithe of the attention they deserve. There are plenty of new questions which amply repay careful investigation, but unfortunately there seems a tendency to discuss again and again old questions which have been practically settled long ago.

The progress of the car coupler question may be realized when we reflect that three years ago the existence of "types" in car couplers was unknown, and that then the Master Car-Builders' Convention passed a resolution in favor of adopting the vertical plane type of coupler when many of the members had but a vague idea of the meaning of the phrase. It would now be probably difficult to find a brakeman of six months' experience who could not give a tolerably correct definition and express some decided opinions on the relative merits of the different types of couplers. Possibly the opinions of no two brakemen would be exactly alike on the question, but that is a mere matter of detail; the main point is that the question has long since progressed to a stage where types and not individual couplers are discussed, and that in a word, the merits of car couplers are now debated intelligently and from a mechanical standpoint, with a far better idea of the duties and essential properties of a good coupler than was possible a few years ago.

The present period is one where the importance and functions of the various details of the couplers are being discussed and gradually becoming more generally understood. The importance of not only having a good coupler, but of being able to control the actions of that coupler by convenient, simple and durable levers and handles is now becoming manifest to all those interested. Consequently many improvements in the gear for working couplers have been made very recently, and further improvements in this line are undergoing experimental test and will shortly be introduced in actual service.

These are signs of healthy and genuine progress, and it is to be hoped that at the next annual convention at Minneapolis the Master Car-Builders will have the satisfaction of hearing from their committees that many important improvements have been made during the past year in freight train brakes, car couplings and safe methods of lighting and heating cars. Whether these improvements are sufficiently tested by actual service to justify immediate general adoption is a wider question, which cannot be discussed prematurely.

THE MISSISSIPPI RIVER IMPROVEMENT—THE ATTAINABLE RESULTS.

II.

In a previous article it was stated that the greatest low-water depths that could reasonably be anticipated as a result of a systematic improvement of the Mississippi River were: 12 feet to Vicksburg, 10 feet to Cairo, 8 feet to St. Louis, 5 feet to Keokuk, and 3 feet to St. Paul; these depths being about 50 per cent. more than are now found at low-water. In proof of this statement facts were adduced showing what had resulted from improvements which may be considered as fairly complete on these several portions of the river. We will now endeavor to show that these are about the limits which the principles of river hydraulics would lead us to predict, or at least that much greater depths than these are impossible.

The average discharge of the Lower Mississippi is about 500,000 cubic feet per second. The maximum discharge is about four times this amount and the minimum discharge is about one-fifth of this amount, so that the greatest flood discharge is some twenty times the low water discharge. We may say that the average annual flood discharge is about twelve times the average annual low water discharge. But the same channel must carry both. The least practicable width for carrying the floods below Cairo has been fixed at 3,000 feet. It may be *possible* to obtain a nearly uniform width of channel of about this amount, but it is too much to even hope for. If the improvement were fairly complete, using the present methods and means, the width of channel would vary between, say 3,000 and 4,500 feet in width. This is as much as could be anticipated, under the most favorable Congressional support, for the next 50 years.

If any given stage of water were to continue long enough the channel would adapt itself to this discharge, and then remain with little or no variation. Evidently the normal channel for a low water discharge is a very different one from the normal channel for a flood discharge. When a river bed is composed of friable material, the river is constantly shifting or carrying this material from one point and depositing it in another in its effort to create a normal channel for that particular stage of water. It is evident, too, that it is always behind in this work, for long before it has accomplished its heavy task, the volume to be accommodated has changed, and a new task is set. The end sought is uniformity of resistance and slope, thus producing a uniform velocity. But the mean velocities vary inversely as the corresponding areas of cross-section, and hence the river is eternally trying to make for itself a uniform effective cross-section. Now, if the banks were at a uniform distance apart, and carried to a uniform height, then uniform cross sectional areas would mean uniform depth. This is the condition of things at the jetties at the mouth of the river. There are two features of the main river which will always serve to prevent obtaining such results as have been reached at the jetties. These are the bends and the variation in width. When a flood discharge is thrown violently against the concave bank of a bend its centrifugal force carries it over against the bank, which it hugs close entirely around the curve, thus requiring and producing a great depth just against this bank. Whatever the original width of channel at such a point the principal part of the volume will pass near the concave bank, and soon the rest of the channel silts up. It is inherent in the nature of things, therefore, that in sharp bends the channel at high stages must be narrow and deep. Now two successive bends always come in opposite directions, so that the deep water, lying always against the concave bank, is on opposite sides of the river in any two successive bends. A steamer must cross over, therefore, from one side of the river to the other, in passing over the intervening stretch of river between two bends. Hence this part of the channel is called a "crossing." Here there is no tendency of the water towards one bank more than towards the other, and so it spreads uniformly over the channel with about a uniform velocity and depth. Since there is no tendency for the water to leave either bank, and since there is always a certain amount of erosion of banks going on, these crossings are certain to become in time very wide and shallow. These wide and shallow crossings are like long weirs intervening between the deep pools in the bends. At high stages their excessive widths more than make up for their diminished depths, so that their sectional areas are much greater than the pool areas in the bends. The velocities are therefore less, and sand is being deposited here which is brought from the bend above. As the river falls the time comes when the sectional areas are equal, and this is the normal bed adjustment for that stage. As the river falls below this normal stage the area on the wide crossing becomes less than that of the pool, and hence the velocity here becomes greater than in the bends, and sand is carried from the bars and deposited in the deep pools. At first the sand-wash from the tops of these great dams is nearly uniform over the whole width, but soon the washing becomes more active along one or more lines than on the other portions, and so one or more channels are cut out through the crest of this great sand bank, which continue to deepen as long as the low water season lasts. These cuts through the wide reaches sometimes are from ten to twenty feet deep, so that the top of the crest becomes entirely exposed across the channel, except where the narrow channels have been excavated through it. Fortunate it is if only one channel is cut through this embankment, for then the whole current flows through this and good navigation results.

In the course of events above detailed, the worst and most uncertain navigation comes on a sudden decline to a stage below the normal before any definite channels have developed through the bar. Thus it is not uncommon for the discharge to fall suddenly to say 160,000 cubic feet per second below Cairo. If the width of a crossing is 4,000 feet, and we have a velocity of 4 feet per second, there would be an average depth of 10 feet over the crossing. After a definite channel had developed through this bar the same or even a much less discharge might give a 12 or even a 15-foot channel over this same bar. It is thus seen how very bad navigation begins long before the stage of low water is reached. A sudden fall to about a 10 or 12-foot stage after a long period of high water is likely to give the worst possible navigation.

For such emergencies as these the river improvements now contemplated and completed offer but little relief. Even with a completely regulated and improved channel below Cairo, suitable for carrying off floods, maximum depths across the wide reaches are likely to be as low as ten feet on a sudden fall of river. If the low-water channels formed during one period of low water could remain intact through a period of high water, and be available at once for the next falling stage, the river would scarcely need improving. But on each high stage all previous low water channels through the wide reaches are at once filled up and obliterated, and on the next falling stage the work must ever begin anew.

There can never be a uniform scour of the bottom at all stages until uniform curvature and uniform width are obtained at all stages. It is impossible to satisfy either of these conditions. It is worse than useless to increase the energy of the river until we can have that energy applied in the right direction. The more energy spent in building up the bars the worse we are off. What is wanted is to diminish the high water and to increase the low water energy. The extremes of stage and volume should be brought nearer together. It is evidently impossible to do much in this direction. To straighten the river would be as useless as to straighten a live snake. It would recover its sinuous form as certainly, if not so quickly, as its crawling counterpart. If the total fall from Cairo to the Gulf were half as much as it is, perhaps something could be done. But in that case the stream probably never would have been so crooked. To obtain and keep a width of greater uniformity than from 3,000 to 4,500 feet would require such fabulous expenditures that it is practically certain that it will never be done, and yet with the present curves and these widths it is impossible to avoid the small depths on bars indicated above, especially on a suddenly falling stage. With a width of 3,000 or 4,000 ft. only, the low water energy is much more likely to be concentrated in one final low water channel than when the width is 5,000 or 6,000 ft., and so the final low water régime is established quicker and with greater final depths on the improved than on the unimproved portions. The first low water depths, after a period of high water and before the low water cuts have been made, are also apt to be 2 or 3 ft. greater on the 3,000 to 4,000 ft. widths than on the 5,000 to 6,000 ft. widths. The ultimate amount of

this increase, however, is small, as compared to what has been generally hoped, predicted and believed by the commercial classes.

A Lesson from Austria.

During the last two years the Austrian Government has made efforts to reduce passenger rates on its own roads and on the private lines more immediately under its influence. The measure was, of course, a popular one; and though its success seemed somewhat doubtful, the reports of a year ago were, on the whole, favorable. The increase of traffic, while not sufficient to make up for the reduction of charges, was expected to do so in the immediate future.

Until the publication of further statistics, it will be impossible to say how far these expectations have been realized. But a paragraph in a recent number of the *Zeitung des Vereins Deutscher Eisenbahn-Verwaltungen* seems to cast an interesting side light on the subject:

The proposed diminution of express train service toward South Germany, Switzerland and France was the subject of discussion in the last meeting of the Vienna Exchange. The proposed changes in the time tables have, as is well known, aroused great opposition in South Germany as well as in Vienna, since the new arrangement would subject the whole westward traffic of Austria to great delays. It would have the effect of delaying the more important mails several hours in either direction. Some weeks ago the Exchange made a formal protest to the Minister of Commerce against the proposed changes, calling attention to the menacing injury (*drohendo Schädigung*) to the financial interests of Vienna; and in this protest they have now been joined by the Chamber of Commerce.

When a railroad takes steps to seriously lessen the facilities which its customers have enjoyed, it shows that there is something wrong somewhere. If everything is managed properly, there is a tendency for business to grow, and for facilities to grow at the same time. The growth of the business makes it able to pay for the facilities; the increase of the facilities helps to make the business pay. By paying for each other, the two things are assured of a somewhat harmonious development.

But when the state steps in and attempts to manage railroads itself, it is apt to set up something besides the commercial standard. The advocates of state ownership say that there are many things which the community needs which private companies would find it unprofitable to do; that the state can reduce rates or build new roads where such an advantage is to be secured. In theory this is probably correct; in practice it fails badly. The commercial standard, well applied, is much better than the ideal standard, with all the doubt and error involved in its application. If the question simply is, "Will a change in policy pay?" the matter is decided from a narrow point of view, but one which gives little chance for favoritism. If we attempt to introduce a variety of other considerations it becomes a mere matter of wire-pulling.

Take the case in hand. Reductions had been made in passenger rates, which very probably were justified by the future of the country. For the time being they seemed to cause a loss. Had the managers of the roads been able to say, "We believe that this loss is only temporary, and we have done this with the expectation that it will be profitable in the long run," they would have occupied a strong position. But they had not done it with this motive. They had gone into the policy with other ideas. They were afraid to call upon the taxpayers to force a reduction of revenue. The paragraph which we have quoted indicates that they were trying to make up for reductions at one point by unwise economies at another.

We may be wrong in our interpretation, but the fact itself is significant. A serious attempt to reduce passenger facilities shows something wrong. The opponents of state railroad influence have often charged that it prevented the development of facilities. If it goes farther, and threatens to withdraw them, the argument against it will be ten times stronger.

Liability to Employes.

The perplexity and difficulty of the questions of railroad management arising upon the liability of companies for personal injuries sustained by employés seem to continue. In England, the well-known employers' liability act, 1880, which was fully explained in several articles during the year of its passage, has introduced rules favorable to employés. The law books say, however, that soon after the law was passed English employers began to exact from their workmen contracts stipulating not to sue for damages for one another's negligence, and as the courts held that they could do so if they pleased, there was nothing unlawful in a man's agreeing to bear extra risks if he chose and acted understandingly, and as Parliament refused to enact a provision declaring such contracts void, the law from which so much was expected has not accomplished a great deal. In this country, little or no change has been made even in the forms of the law. According to condensed statements published about two years ago, eight states, namely, California Georgia, Iowa, Kansas, Mississippi, Rhode Island, Wisconsin and Missouri, and three territories have legislated on the subject; two or three of them to very little purpose, most of them favorably to some increase of the liability of a company and one or two with the stringent provision putting it out of the power of an employé to bargain away his privilege. Upon the whole it may be said that half a dozen states and half as many territories allow a recovery of damages in favor of servants of a railroad company for hurts which they receive in the performance of their duties, which are not due to any negligence of their own. But these few states are not sufficiently numerous or important to work any material change in the railroad law of the land. As a general rule throughout the country, the principles are expressed as of old: the law still denies damages to a railroad employé for an injury which is attributable either to the man's own negligence or to that of a fellow servant engaged "in the same general business." It allows his claim where the injury was caused by the fault of the direction or of the superior officers having general authority, or was due to negligence of another employé engaged in a different and distinct employment.

But the courts are still wrestling as confusedly as ever with the conundrum—what is meant by the phrase "the same general business?" One recent writer has catalogued more than fifty decisions in New York alone and nearly sixty in Massachusetts rendered on this single subject during the half century of railroad law; and other states have about the same number in proportion. A want of general knowledge and of harmony of view on the part of judges, as to the nature of the various duties which devolve upon the various employés of a railroad company may have contributed to cause the conflict of opinion and uncertainty of decision; but they are unfortunate.

The point that although two servants are at work together, yet if one has authority over the other they are not esteemed in the same employment has become generally settled. On the Burlington & Missouri River road there was a gravel train and gang of men digging gravel from underneath a high bank and loading it upon dirt cars. The conformation of the ground was such that as often as a considerable quantity of gravel had been removed from below, down would come the earth or crust of the bank above it, for want of support. The laborers were accustomed to keep one of their number stationed upon the bank to give them warning when there was likely to be a fall. One day there was such a fall of earth which buried one of the cars. The conductor of the train was in a hurry to get a load and he called to a colored man named Clayborn Crockett, who was what was called "sub boss" of the gang of diggers "go and get that car out as quick as you can." Now, at this moment, the customary watchman was not in his place to give notice of cracks in the soil. Crockett did not know this, but went and began the task of extricating the car, expecting to be notified if there should be any danger; however, there came a second fall of earth by which he was killed. His mother, whom he had supported, brought suit for damages, and as there was plainly negligence in sending Crockett to work under the bank without the precaution of the watchman, of course the case brought up the familiar question whether the conductor of the train sent to get the gravel and the sub-boss in charge of the men employed to dig it were to be considered in the same employment. The Court said no. That rule does not apply where a subordinate is injured by the negligence of his superior. Evidently this conductor represented the company, for he gave absolute commands to Crockett, and the latter simply did as he was bid.

But in other states, cases very much like this in their circumstances have been decided in the opposite way.

Two men may be doing very different kinds of work, yet if the different things they do all contribute to the same part of the company's enterprise, they will be deemed engaged in the same general business. Thus the conductor, the engineer, the fireman, the brakeman, the switch tender, have very different duties, but they all co-operate in the same general function—the running of the train. Hence, except so far as the conductor's superior authority may, in some instances, be involved, they would in most of the states be considered in the same general employment, and neither could claim damages for mere casual negligence of the other.

The Pennsylvania Railroad Co. employed a man to work at repairing cars in the yard. This man had no previous experience; and when he was told to mend a defect in the wheel of a car standing on the main track, he knew no better than to crawl under the car. While he was at work, a train of seventeen loaded cars coming down a descending grade, drew near. The brakeman did not control the train, it struck the car standing on the track, and one of the limbs of the workman underneath was crushed, so that it had to be amputated. In his suit for damages, the Court held that the brakeman on the moving train and the workman underneath the stationary one, were in the same general business, viz., the running of trains. The latter, when he engaged to mend cars for running in trains, took the risk that he might be hurt by other cars of the same company which might be running in trains, if both cars were on the same track. He ought to have known that a car standing on the main track was liable to be struck by an in-coming train.

And, generally, two men are not in different employments, because they work on two different trains. The courts regard the train-running work of one company as constituting one and the same business. This was decided lately, in a case where the fireman upon one locomotive was killed by its collision with another locomotive, solely in consequence of the carelessness of the other engineer; both being in the service of the same company. The Court said that in almost all of the states of the Union, if two men are employed by the same company, in the same department of its business, they are in the same employment.

But what is said of cases where two companies use the same track, occupy the same depot, or connect their lines in business, so that their employés are involved in the same duties and tasks. Do men thus employed by different companies but working together take the risk of each other's negligence? They do not. If trains of two different companies come in collision through negligence of the engineer of one, and the conductor of the other is hurt, his right to damages against the employers of the careless engineer is not affected by their arrangements or bargains with his own company. The doctrine of limited liability does not apply unless the two men are working in the same employment. So it does not apply between men employed by a railroad company and those employed by a contractor with the company, even though both are at work upon the same job of construction; this, at least, is the general opinion in the courts.

Some interesting decisions bearing on this subject will be found in the "Notes of Decisions" in another column.

March Accidents.

Our record of train accidents in March, given in this number, includes 45 collisions, 58 derailments and 13 other accidents; a total of 117 accidents, in which 59 persons were killed and 212 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	20	
Butting	22	
Crossing	3	
		— 45
DERAILMENTS:		
Broken rail	6	
Loose rail	2	
Broken bridge	6	
Broken switch	1	
Broken wheel	1	
Broken axle	2	
Broken truck	1	
Loose wheel	1	
Fall of brake	2	
Misplaced switch	3	
Cattle on track	2	
Snow	2	
Accidental obstruction	1	
Miscellaneous	3	
Unexplained	26	
		— 59
OTHER ACCIDENTS:		
Broken parallel or connecting rod	5	
Miscellaneous	8	
		— 13
Total number of accidents		117

The causes of collisions where given were as follows:

Trains breaking in two	2
Misplaced switch	5
Failure to give or observe signal	5
Mistake in giving or understanding orders	5
Miscellaneous	5
Unexplained	23
Total	45

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	15	..	15	13
Defects of equipment.	3	7	7	17	15
Negligence in operating	17	5	2	24	20
Unforeseen obstructions	..	5	3	8	7
Maliciously caused	..	1	..	1	1
Miscellaneous	2	..	1	3	2
Unexplained	23	26	..	49	42
Total	45	59	13	117	100

The number of trains involved (not the number of accidents) is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	24	16	6	46	29
Freight and other.	68	39	7	114	71
Total	92	55	13	160	100

The casualties may be divided as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
KILLED:					
Employés	8	16	8	32	54
Passengers	1	24	..	25	43
Trespassers	..	2	..	2	3
Total	9	42	8	59	100
INJURED:					
Employés	31	35	2	68	32
Passengers	7	135	..	142	67
Trespassers	1	1	..	2	1
Total	39	171	2	212	100

Eighteen accidents caused the death of one or more persons each, and 28 caused injury, but not death, leaving 71—60 per cent. of the whole—in which no injury of consequence was reported.

The comparison with March, 1886, shows:

	1887.	1886.	Inc. or Dec.
Rear collisions	20	16	I. 4
Butting "	22	5	I. 17
Crossing "	3	1	I. 2
Derailments	59	55	I. 4
Other accidents	13	4	I. 9
Employés killed	32	42	D. 10
Others "	27	7	I. 20
Employés injured	68	52	I. 16
Others "	144	79	I. 65
Pass. trains involved in accidents	46	29	I. 17
Average per day:			
Accidents	3.77	2.61	
Killed	1.90	1.58	
Injured	6.84	4.23	
Average per accident:			
Killed	0.504	0.605	
Injured	1.812	1.617	

Like January and February, this month presents an appalling record of passengers killed, the total for the quarter (of all persons except employés) being 81, as compared with 10 for the first quarter of 1886. The number of *employés* killed in March, however, is much less than that for March, 1886, thus reminding us that in spite of the great disasters of this year, which have made such a vivid impression on the public mind, the passenger still has a comparatively safe berth in comparison with his servant, the trainman, who has to brave the "dangers of the rail" every day and under all sorts of circumstances.

The butting collisions, though fewer than last month, still count up four times as high as in March, 1886. These being in nearly or quite every case the result of "negligence in operating" should be seriously pondered by every officer whose trainmen are not absolutely perfect.

Several of the accidents are noteworthy for one cause or another. One derailment of a passenger train near a bridge is reported to have been much less serious than it would have been "but for a new guard timber placed upon the bridge the day before," though it was bad enough as it was, one man being killed.

The distressing case of the engineman on the Pittsburgh, Fort Wayne & Chicago, who was killed while attending to his duty under the tender of his own engine, is an illustration of the unremitting caution demanded on even the best managed roads. We have seen no full particulars of this collision, but from the accounts it would appear that the simple rule limiting the speed of freight trains or the other rule prescribing a certain interval between trains must have been disregarded. Whether the fault was here or with the flagman of the passenger train, the occurrence shows the force of the clause in the uniform code that all rules if worthy of existence at all "should be literally and absolutely enforced." Some officers would do well to ask themselves upon whose shoulders they place this duty (of literally and absolutely enforcing the rules), and whether it is properly performed.

The smothering of a whole crew, including a superintendent, under a snow slide on the Canadian Pacific, illustrates the tragic side of railroading and the peculiar dangers of the Northwest.

The Transportation Question in the "North American Review."

It is unfortunate that our magazines so often select persons to write on important topics who seem utterly unacquainted with the subject in hand, and unable, by the cursory study thought necessary for the task imposed, to put themselves in touch with the problem, while on any subject not involving correlated facts, their conclusions would doubtless be of interest and value.

The current number of the *North American* gives up nine pages of its space to an arraignment of railroad "magnates," developing the idea that "other nations have grown apace in the governing function with railroad development; we have not;" and charging that they, "beyond acting as administrators or quasi administrators of the property they represent, contribute nothing to the social economy proportionate to the power lodged with them."

No plan is recommended beyond the statement, "inasmuch as the new law can be accepted as the highest wisdom of the chief law-makers of the nation on the subject of Interstate commerce in their collective capacity, it is the duty of all to accept it in good faith, and to rest assured that the period of Congressional neglect on this subject is over, and that if it proves imperfect it can be readily amended."

The above is a fair sample of the mental processes of many people. During the past twenty years our freight rates have fallen to between one-third and one-fourth of what they were, until they stand lower than those of any other people, and every one will agree with the essayist that we have not grown apace with the governing function, if that means that the railroads of no other country have been so free from government interference. But there was an immediate call for National legislation; no one was quite certain what legislation was desirable nor were those who passed our Inter-state Commerce bill certain what they thought it meant; but legislation must be had, and we have a measure, the effects of which no one can foretell.

It is doubtful what was intended by the article in the *North American* unless this sentence, "The political economy of Great Britain that was rounded and perfected as a science after the repeal of the Corn Laws, but has since been so demolished in its wage fund theory, that now rests so unsteadily on its premises in the theory of Malthus, and that in general has suffered rack, had incorporated nothing on the unity of transportation, and it is a fresh subject for this generation with which to deal," is an indication that the writer is a postulent for Professor Ely's position as Professor of Political Economy in the Johns Hopkins University.

The article on "Economic Optimism" differs from the preceding in that it is an effort to show that we are not getting along as fast as Mr. Edward Atkinson pretends in the January and February numbers of the *Century*. Mr. Datus C. Smith seems to be a pessimist of an unnecessarily dark dye. After objecting to Mr. Atkinson's comparison of railroad rates as a comparison of present rates with the water rates of 1865, he says, "I have been unable to find any statistics of the volume of all-rail transportation of grain from Chicago to New York in 1865, for the sufficient reason that practically there *was* none." And, in support of this assertion, he cites the receipts *via* the Erie Canal for 1865 "of all products for the Western States alone, chiefly grain and meats, was 1,914,156 tons, equivalent in weight to 63,471,866 bushels of wheat," adding, on the authority of Mr. E. H. Walker, that the receipts of all kinds by the Erie and Champlain canals of grain and flour reduced to wheat were 51,400,400 bushels.

An examination of the rates charged in 1865 on the basis of 4½ bushels of wheat to the barrel of flour, showing a charge equal to 76.6 cents per bushel, against an actual charge by water averaging 26.6 cents for the year, leads Mr. Smith to say: "Thus we surely find an error of 50 cents per bushel of wheat in Mr. Atkinson's figures. This will scatter to the winds $112,500,000 of the sum shown to be annually saved to us by the railroads. The remainder, as could be easily demonstrated, may be found in the paper money inflation of 1865, and in the reduced charges that have actually been brought about, not by the railroads, but invariably in the water transportation, the railroads respectfully following at as great a distance as consistent with their getting some of the business."

There are reasons for thinking that greater knowledge of the facts would have kept Mr. Smith from taking so unfavorable a view. A barrel of flour was reduced at the rate of 5 bushels of wheat till July 1, 1879. In Nimmo's Report on the Foreign Commerce of the United States for 1884 will be found a table giving the average rates of freight by lake and canal from 1857 to 1884, both years inclusive, in which the lake and canal rate for 1865 is given as 28.37 cents per bushel. This same table of Mr. Nimmo's throws some light on the "respectful following" of the railroads in freight rates and also on the effect of the paper inflation. By dividing the time covered into 5 periods of 5 years each and one of 3 years, we have one period ending in 1861 when there was no inflation, with an average rate of 22.804 cents per bushel. One ending with 1866, during which the average value of the greenback in gold was 67.66 cents, and the average freight was 27.914 cents. One ending with 1871, during which the average value of the paper dollar was 77.89 cents, when the average freight was 21.822 cents. One ending 1876, during which the dollar stood at 88.32 freight was 15 76 cents.

The dollar was at 94.7 and 99.4 in 1877 and 1878, freight averaging 10.49 cents, and for the three years ending 1884, the average freight rates was 7.63 cents, or about 33 per cent. of what it averaged before inflation commenced, and 27 per cent. of the average during the time inflation was the greatest.

It is possible that Mr. Smith is mistaken in assuming that the receipts that year *via* the Erie Canal of all products from the Western States alone was chiefly grain and meats, for the *entire* tonnage of all the canals of the state for that year was grain, including bran, peas and beans, 1,554,539 net tons, and all animal products, from live stock to lard oil, transported that year, amounted to only 27,331 tons, according to the report of the State Auditor of Accounts.

It is not necessary in this place to go into the question as to whether by the aid of deepened channels and consequent larger boats the lake marine has forced the roads to adopt lower freight rates or the action has been the converse, or there has been a reciprocal influence; the fall in rates cannot be doubted.

	Flour. Barrels.				Grain. Bushels.				Grain and flour to bushels			
	By lake. 1,000 = 1	Per cent.	By rail. 1,000 = 1	Total. 1,000 = 1	By lake. 1,000 = 1	Per cent.	By rail. 1,000 = 1	Total. 1,000 = 1	By lake. 1,000 = 1	Per cent.	By rail. 1,000 = 1	Total. 1,000 = 1
1858	377.5	82.0	81.5	459.0	17,758.2	99.4	98.5	17,856.7	19,645.7	97.5	506.2	20,151.9
1859	365.3	54.4	306.5	671.8	12,214.3	93.1	905.1	13,119.4	14,040.8	85.1	2,437.7	16,478.5
1860	218.4	34.8	408.1	626.5	25,670.3	96.2	1,018.2	26,688.5	26,762 3	83.0	3,058.6	29,820.9
1861	524.7	35.1	1,001.6	1,544.3	40,849.9	97.0	1,281.2	42,131.1	43,563.4	83.0	6,289.3	49 852.7
1862	1,144 0	63.0	672.0	1,816.0	47,451.0	98.2	875.9	48,3:6.0	53,171.0	92.6	4.235.0	57,406.0
1863	1,006.0	78.8	270.8	1,276.8	42,279.0	94.2	2,585.5	44,864.5	47 309.0	92.3	3,939.5	51,248.5
1864	1,034.3	83.1	210.0	1,244.3	34,167.0	89.5	3,987.6	38,154.6	39,338 5	88.6	5,037.5	44,376.1
1865	646.0	47.4	717.3	1,363 3	40,537.8	91.9	3 568.3	44,106 1	43,767.8	85.9	7,154.8	50,922.6
1866	481.0	23 6	1,555.7	2,036.7	44 335.0	85.2	7 694.7	52,0:9.7	46,740.0	75.1	15,473.2	62,213.2
1867	650.4	33.9	1,267 6	1,917.9	40,429.0	89.6	4,697.5	45,126.6	43,680.9	79.9	11,035.3	54,716.2
1868	774.6	28.4	1,949.3	2,723.8	44,357.6	81.8	9,839.1	54,193.7	48,230.4	71.1	19,582.4	67 812.8
1869	829.3	35.4	1,509.8	2,339.1	34,256.2	76.0	10,808.0	45,064.2	38,402.5	67.1	18,257.0	56,759.5
1870	574 4	33.7	1,131.6	1,706.0	35,462.0	76.7	10,754.0	46,216.0	38 333.9	70.0	16,412.1	54,746.0
1871	488.7	38.0	798 9	1,287.6	57,563.7	87.2	8,443.0	66,006.7	60,007.2	82 8	12,437.4	72,444.6
1872	223.5	16.4	1,137.9	1 361.3	59,354.2	76 8	17,884.0	77,238.2	60,471.5	71.9	23,573.4	84,044.9
1873	428.3	18.6	1,875.2	2 303.5	57,460.9	70.7	23,770.5	81,231.4	58,602 5	64.3	33,146.3	92,748.8
1874	555.2	24.0	1,751.4	2,306.6	52,361.3	71.1	21,279 8	73,641.1	55,137.1	64.7	30,036 9	85,174.0
1875	328.3	14.4	1,956.8	2,285.1	42,691.8	69.0	19,'94.3	62,086.2	44,333.2	60 3	29 178.5	73,511.7
1876	236.6	9.0	2,398.2	2 634 8	40.678.3	53.2	35,306.2	75 384.5	41,:61.3	46.6	47,297.4	88,558.7
1877	148.8	6 0	2,333 5	2,482.3	57.054.9	71.7	22,480.8	79 535.7	57,798.8	61.8	34,184.4	91 947.2
1878	321.6	11,2	2,458.0	2.779.6	67,887.7	64.0	38,279.4	106.167.1	69,496.0	57.9	50,509.3	120,065.3
1879	330 3	10.6	2,760.3	3,090.5	62,140 0	55.7	49.480.9	111,620.9	63,791.3	50.2	63,282.4	27,073.6
1880	527.9	18.5	2,334.9	2,862.7	91.777.6	64.8	49,717.2	141,484.8	94.153.1	61.0	60 224 0	154 377.1
1881	159.4	3.6	4,340.3	4,499 7	56.662.2	47.2	63,396 5	120,058.8	57,379.6	40.9	82,928.0	140.307.6
1882	792.8	20.6	3,050.3	3 843.1	50,782.3	52.1	46 789.8	97,571.1	54,348.8	47.3	60,516.2	114,864 9
1883	861.1	20.0	3,198 3	3,999.4	55.599.9	44.9	68,122.9	123.722.8	59,204 8	41.7	82,5 5.4	141.720.3
1884	753.4	15.3	4,185.6	4,939.0	73,376.3	61.0	46,893 1	120,269.4	76.766.4	53 8	65,728.5	142,494.9
1885	652.4	12.5	4,587 8	5,240.2	96,707.5	32.7	75,300.5	172,007.0	39,643.2	29.3	95,944.7	135,587.9

Trunk Line Through Shipments.

EAST-BOUND.

The east-bound freight tonnage of the trunk lines (including all shipments originating at or west of their western terminal) amounted in March to 1,063,010 tons. This was an increase of 43 per cent. over the February business.

For the last eight years, the March shipments have been, in tons:

1880	1,013,567	1884	782,376
1881	881,903	1885	1,121,252
1882	622 042	1-86	939, 50
1883	976,448	1887	1,063,010

Thus, the shipments last month were greater than in the same month of any other year except 1885, when they were 5.5 per cent. greater than last month. The March business in 1886 was 12 per cent. less than last month. There was a slight increase in the grain movement to the seaboard as compared with March, 1886, in consequence of the larger export trade.

The total east-bound tonnage of the trunk lines from Western termini, for the three months ending March 31, have been:

Year.	Tons.	Year.	Tons.
1880	2,242,567	1884	2,033,106
1881	2,354,627	1885	2 835.412
1882	2.053,083	1886	2.501,243
1883	2,561 027	1887	2,597,361

The three months' business this year was nearly 4 per cent. larger than the tonnage of the corresponding period in 1886; and it is a larger tonnage than the trunk lines carried in the first quarter of any previous year, except 1885. The tonnage of the first quarter of 1885 was 9 per cent. greater than that of the three months ending with March of this year; but the earnings from the business this year must have been very much larger than in 1885.

In the early part of 1885, the published tariff rates were on the basis of 25 cents on grain, Chicago to New York; but the actual rates were very much lower, as there existed "a go-as-you-please" competition, which was continued until about the last of the year. This year, up to April 1, the tariff rates were on the basis of 30 cents on grain, and while there have been more or less irregularities, the actual rates were not very much, if any, below the 25 cent basis.

In comparing the business of the last two years with that of previous years, it must be remembered that a new competitor (the Lehigh Valley) has entered the field for through business; and that the east-bound shipments of that road are not included in the figures shown above. We are not in possession of any statistics showing what the shipments by that road have been; but for the last three months 12 or 13 per cent. of the rail receipts of flour and grain at New York arrived by the Lehigh Valley. While this is a very much larger percentage that it has carried of the total east-bound through traffic, there is no doubt that it carried a considerable tonnage, and if its tonnage was added to the tonnage of the other trunk lines, the aggregate would probably equal if not exceed the total east-bound business for the first quarter of any previous year.

Considering this, and the fact that the east-bound shipments during the last six months of 1886 were larger than those of the last six months of any year since 1880, the showing for the quarter of the year is most excellent. Of course, one reason for this showing has been the large export demand for grain and provisions, the exports of these commodities since Jan. 1 having been very large, as was shown in detail in the *Railroad Gazette* of last week.

WEST-BOUND.

The west-bound business from New York to trunk line western termini and beyond was very large in March last, being 154,448 tons. This is an increase of 72 per cent. over the February shipments, and has only been twice exceeded by the tonnage of any previous month since the west-bound poo

was organized in 1877. The two months when the New York shipments were greater than last month were March and April, 1882, when the tonnage amounted to 164,644 tons and 158,693 tons respectively. That year, however, the rates were much lower than during last month. After the railroad war in 1881, the roads got together in January, 1882, and agreed to establish tariff rates on the basis of 45 cents per 100 lbs., New York to Chicago; but some of the lines had a large number of contracts which would not expire until July 1, and used the 30 cent basis. This year, however, the tariff rates were on the basis of 75 cents to Chicago, and while there has been, no doubt, more or less deviation from tariffs, the rates were probably fairly well maintained. Therefore, the actual revenue received by the roads from the west-bound business must have been very much larger (if not nearly double) last month than in March, 1882, and it probably was about the best month's business they have had in late years.

This enormous tonnage of last month was, to a degree at least, in consequence of the uncertainty of shippers as to what was going to be the effect of the Inter-state Commerce law. Such shippers as had special rates, of course, availed themselves of them to the greatest extent possible before the law prohibiting special rates and rebates was effective. Others had misgivings as to the outcome of the enforcement of the long-and-short haul clause, and acted accordingly. But there is no doubt that the general prosperity of the country has had a very material influence in the continued large business of the last eight months.

For the last eight years the March shipments, and the shipments for the three months ending with March, have been from New York:

March:

Year.	Tons.	Year.	Tons.
1880	95,759	1884	106,026
1881	102,966	1885	105,866
1882	164,644	1886	104,844
1883	115,232	1887	154,448

For the three months ending with March:

Year.	Tons.	Year.	Tons.
1880	267,679	1884	294,730
1881	256,581	1885	270,500
1882	388 111	1886	270,927
1883	294,762	1887	338,041

As shown above, the movement for the three months of this year was about 25 per cent. larger than for the corresponding period of last year, and was a larger tonnage from New York than the roads carried during the first three months of any other year except 1882. In the first quarter of 1882 the tonnage was 15 per cent. greater than in the three months just past. But since 1882 the Lehigh Valley has become a competitor for New York business, and if the tonnage of that road was included in the figures for the last three months, the comparison of the tonnage of the first quarter of the two years would not show by any means so great a difference between this year and 1882. It is altogether probable that the traffic diverted to the New London route and other outside lines was much larger the last three months than during the first three months of 1882, as the trunk line rates were so low then that there was not the same inducement for the outside lines to exert themselves to obtain a large amount of traffic, as they had this year when the tariffs were on a much higher basis.

The through shipments from the three other Atlantic cities (Boston, Philadelphia and Baltimore) last month aggregated 80,940 tons, being 35 per cent. greater than the traffic from the same points in March, 1886. In fact the month's business is larger than the March business of either of the seven years previous, as will be seen from the following statement showing the tonnage from the three cities during March and during the three months ending March:

March:

Year.	Tons.	Year.	Tons.
1880	71,801	1884	62,906
1881	67,719	1885	61,878
1882	74,334	1886	59,929
1883	63,555	1887	80,940

For the three months ending with March:

Year.	Tons.	Year.	Tons.
1880	211,347	1884	169,517
1881	169,095	1885	165,833
1882	198,477	1886	154,528
1883	161,807	1887	192,164

The business for the three months of this year, though much larger than the average, is 9 per cent. less than the tonnage for the first quarter of 1880, and 3 per cent. less than for the first three months of 1882.

Northwestern Grain Receipts.

The grain receipts (not including flour) at the eight principal Northwestern markets (Chicago, Milwaukee, Toledo, Detroit, Cleveland, St. Louis, Peoria and Duluth) during the first 13 weeks of this year amounted to 51,686,845 bushels. For the same period last year the receipts at these markets were 49,595,258 bushels, and in 1885 they were 65,072,480 bushels. The receipts for the 13 weeks this year were, therefore, 4.2 per cent. greater than last year, and 20½ per cent. less than the receipts for the first quarter of 1885.

The receipts of flour at these markets for the same period this year amounted to 2,781,003 bbls.; and for the first 13 weeks of last year, 1,933,850 bbls.; and 2,149,673 bbls. in 1885. Thus the flour receipts this year were 41.6 per cent greater than last year's receipts, and 29.4 per cent. greater than the receipts of 1885.

The total receipts of flour and grain for the first 13 weeks of the year have been, in bushels:

1887.	1886.	1885.
64,201,359	58,432,583	74,746,009

The total receipts this year were 9.9 per cent. more than last year, and 14.1 per cent. less than in 1885. The percentages of the several markets of the total flour and grain receipts of the quarter have been:

Year.	Chicago.	Milwaukee.	Toledo.	Detroit.	Cleveland.	St. Louis.	Peoria.	Duluth.
1885	49 9	8.8	3.9	4.0	1.7	19.9	9.4	2.4
1886	49.0	12.2	3.7	5.4	2.6	16.2	8.5	2.4
1887	53.8	9.7	3.3	4.7	2.3	17.6	6.4	2.2

Thus the Chicago receipts so far this year are relatively greater than in either of the two preceding years, while the percentage of Milwaukee, the nearest competing market, is 2.5 less than last year. In order that the variations in the relative receipts at the several markets can be better understood, it is necessary to consider separately the receipts of flour and the various kinds of grain.

The flour receipts at the several markets for the 13 weeks have been as follows:

	1885. Bbls.	1885. P. c.	1886. Bbls.	1886. P. c.	1887. Bbls.	1887. P. c.
Chicago	1,332,328	61.9	789.753	40.2	1,733,115	62.3
Milwaukee	366,067	17.0	862,785	43.9	581,420	20.9
Toledo	27,053	1.3	56,380	2.9	74,853	2.7
Detroit	26,928	1.3	38,257	2 0	45,644	1.7
Cleveland	39,880	1.9	45,332	2.3	49,803	1.8
St. Louis	304.282	14.1	156,898	8 0	273,070	9.8
Peoria	53,195	2.5	14,445	0.7	23,068	0 8
Total	2,149,673	100.0	1,963.850	100.0	2,781,003	100.0

The Chicago receipts this year were 62.3 per cent. of the total flour receipts at the Western markets, as against 40.2 per cent. last year; but the receipts at Chicago for the first three months of last year were extremely small, being less than the Milwaukee receipts. While the Milwaukee percentage this year is only about one-half of its percentage in 1886, it is 3.9 more than in 1885; and the actual quantity received this year is only about one-third less than last year. The St. Louis receipts last year were very small, owing, partly at least, to the labor troubles at that point. While the actual receipts at that point this year are about 80 per cent. greater than the receipts last year, the percentage is only 1.8 more. Over nine-tenths of the flour receipts of the 8 markets are at Chicago, St. Louis and Milwaukee, and with the large increase in the wheat crop of the Northwest last season over the crop of the previous year, it is but natural that the increase in the flour receipts should be mainly at the more northern markets. This seems to have been the case, and for the last three months Chicago receipts of flour are nearly 1,000,000 bbls. greater than those of last year. A fairer comparison may possibly be to take the combined receipts of Chicago and Milwaukee, which show an increase of about 650,000 bbls. over last year's receipts. The total increase in the receipts at all ports this year over last is 820,000 bushels.

The Northwestern wheat receipts for the 13 weeks, as will be seen from the following statement, have been 3 million bushels more this year than last, and 5 million bushels less this year than in 1885. The receipts and percentages of the several markets have been:

	1885. Bushels.	1885. Per Ct.	1886. Bushels.	1886. Per Ct.	1887. Bushels.	1887. Per Ct.
Chicago	4,718,521	31.4	1,504,016	20.9	3,052,231	30.1
Milwaukee	2,953.028	19.6	1,216,522	17.0	1,889,011	18 6
Toledo	1,611,756	10.7	664,828	9.3	858,378	8.4
Detroit	1,220,464	8.1	1,099,064	15.2	1,276,937	12.6
Cleveland	487,850	3.3	516,653	7.2	537,440	5 3
St. Louis	2,207.057	14.7	721,540	10.1	1,032,211	10.2
Peoria	91,240	0.6	77,170	1.1	118.550	1.2
Duluth	1,750,204	11.6	1,379,959	19.2	1,384,095	13.6
Total	15,040,120	100.0	7,179,752	100.0	10,148,853	100.0

The receipts for the first quarter of 1886 were extremely small, as could naturally be expected with the small wheat crop of 1885; but Chicago suffered more than any of the other points, its receipts being only 20.9 per cent. of the business, while Duluth and Detroit receipts were relatively unusually large, the percentage of Duluth being 19.2 and of Detroit 15.2. Detroit receipts were probably increased by "short" billing to that point for the purpose of evading tariffs. This year, however, the circumstances were a little different. While the wheat crop of last year was not by any means equal to the crop of 1884, it was about an average one and much better than the crop of 1885. Consequently the receipts of this year were better than those of the corresponding portion of the previous year, though about one-third less than for the same time in 1885. This year Chicago seems to have received about its fair proportion of the business, while Duluth receipts are only about the same as last year. With the large increase in the wheat crop of the territory from which Duluth draws its supply, it was to be expected that the receipts of that port would be greater than the above statement shows. Its percentage of the total wheat receipts for the entire year of 1886 was 22.2. In January last, the receipts at Duluth were over 25 per cent. of total January receipts of the eight markets, but since that time its receipts have been practically nothing. The actual receipts at Detroit this year were larger than for either of the two previous years, though its percentage this year was 2.6 less that last year. Milwaukee received about its usual proportion, but while St. Louis receipts this year were about the same proportion of the total as in the previous year, its actual receipts this year were only about one-half what they were in 1885, and its percentage 4.5 less. At the less important markets there does not seem to have been any very great change.

The receipts of corn at the eight markets during the first quarter of the year have been:

	1885. Bushels.	1885. P.c.	1886. Bushels.	1886. P.c.	1887. Bushels.	1887. P.c.
Chicago	15.909.620	50.2	12,738.880	51.8	11,063,324	51.2
Milwaukee	154,370	0.5	181,210	0.7	348.450	1.6
Toledo	1,125,937	3.5	1,067,731	4.3	782.224	3 6
Detroit	1,235.743	3.9	1,272.573	5.2	837,460	3.9
Cleveland	375,000	1.2	437,590	1.8	308,700	1.5
St. Louis	9,147.639	28.9	6,498,180	26.4	6,710,126	31.1
Peoria	3,758,695	11.8	2,411,085	9 8	1,537,850	7.1
Total	31,707,004	100.0	24,607,849	100.0	21,588,134	100.0

The corn receipts this year were 12 per cent. less than for the same period of the previons year and 32 per cent. less than the receipts for the first quarter of 1884. As the corn crop of last season was smaller than the crop of either of the two previous years, this was to be expected. For the twelve months of last year the St. Louis corn receipts decreased as compared with its receipts in previous years; but for the first quarter of this year it seems to have regained its standing and secured a larger percentage of the total receipts than it had in the same portion of the two previous years. Peoria's percentage this year (7.1) was 2.7 less than last year, and 4.7 less than in 1885. Chicago does not appear to have either lost or gained much, and still continues to get over 50 per cent. of the total corn receipts of the eight markets.

The oats receipts for the first quarter of this year at the Northwestern markets were 14.2 million bushels as against 11.5 million bushels in 1886 and 12.3 millions in 1885, and the percentages of the several markets have been for the quarter:

Year.	Chicago.	Milwaukee.	Toledo.	Detroit.	Cleveland.	St. Louis.	Peoria.	Duluth.
1885	61.9	2 7	0.3	1.7	1 6	10.0	20.8	0.1
1886	62.6	2.9	0.0	2.8	2 4	9.7	19.0	....
1887	65.5	4 2	0.4	2.6	2.3	10.6	14 4	....

Dressed Beef and Cattle Traffic.

For the last six years the receipts of cattle and dressed beef at New York during the first three months of the year have been, in tons:

	1882.	1883.	1884.	1885.	1886.	1887.
Cattle	90,846	93,905	75,595	83,080	71,946	62,843
= beef	55,202	53,526	43,089	47,356	4 ,667	38,820
Dressed Beef	4,346	5,696	10.453	15,240	19,181	
Total	55,202	57,872	48,785	57,809	55,907	58,001

The total receipts in equivalent beef was slightly greater for the three months just past than in the corresponding period of either of the previous years. With the exception of 1884, when the tonnage for the first quarter of the year was only 48,785 tons, there does not appear to have been any very great variation in the amount of the combined cattle and dressed receipts at New York during the first quarter of the several years. The statement therefore, is of interest mainly in showing the development of the dressed beef business of this city. Prior to November, 1882, the dressed beef shipments to New York were insignificant. In that month the receipts were a little over one thousand tons; since then the increase has been regular, until for the last eight or nine months it has averaged between six and seven thousand tons per month. For the three months ending with March of this year the beef shipments constituted one-third of the combined cattle and dressed beef receipts at New York, reduced to equivalent dressed beef on the basis of 57 lbs. of beef as the equivalent of 100 lbs. of the live weight of cattle.

The dressed beef traffic was an established business to New England long before the shippers of that article began to compete in the New York market, and for the last six or seven years the New England dressed beef traffic has been larger than the actual tonnage of live cattle to the same territory. For the three months ending with March, the shipments to Boston and New England have been, in tons:

	1882.	1883.	1884.	1885.	1886.	1887.
Cattle	17,796	21,614	16.015	13.979	10,432	8,467
= beef	10,109	12,320	9 129	7,968	5,946	4,826
Dressed beef	22,890	25,184	20,036	30,077	35,828	32,859
Total	32,999	37,504	38,165	38,045	41,774	37,685

Thus the total shipments for the three months of this year are about 9 per cent. less than the shipments for the first quarter of 1886, and practically the same as the shipments for the corresponding period of each of the three previous years. For the three months of 1882 the dressed beef shipments constituted 69 per cent. of the total; and in the three months of this year 87 per cent. This would seem to sustain the cattle shippers' claim that they are virtually driven out of the beef traffic of the Eastern states.

Ever since the dressed beef enterprise was started the competition between the live stock and dressed beef interests has been very bitter. From the start the railroads have been involved in the contest, and many millions of revenue have been sacrificed by the various roads in endeavoring to protect the interest with which they were identified, and settle the controversy by a war of rates. From time to time there have been temporary truces and agreements made in regard to a proper adjustment of rates on the several classes of traffic with the view to placing the live stock and dressed beef shippers on an equal footing so far as the cost of transportation was concerned. When agreements could not be reached, arbitration has been resorted to for the purpose of attaining the result sought for; but, unfortunately, so far no satisfactory settlement of the question has been reached. It is very doubtful whether any of the agreements have been lived up to by all the parties interested for a sufficient time to demonstrate whether the basis agreed upon was a proper one. Tariffs have been established from time to time, but what the actual net rates have been is known only to the parties receiving the rebates and the roads by whom they were paid. So far as the statistics show, however, the dressed beef interest does not appear to have suffered very much.

Pork Packing in the West.

The winter packing season, which includes the four months from Nov. 1 to Feb. 28, inclusive, has been as good as could reasonably be expected. The number of hogs packed in the West and their weight, during the winter season, has been as follows, during the last sixteen years:

Year.	No. hogs.	Million lbs.	Year.	No. hogs.	Million lbs.
1871-72	4.831.558	1,374.7	1879-80	6.950,451	1.850 1
1872-73	5.410,314	1,571.9	1880-81	6,919.456	1,796.6
1873-74	5.466,200	1,468.9	1881-82	5.747,700	1,509.9
1874-75	5,566,226	1,459.5	1882-83	6,132.212	1 637.4
1875-76	4,880,135	1.328.1	1883-84	5 402 064	1,358 3
1876-77	5,101,308	1,376.8	1884-85	6,460.240	1,721.7
1877-78	6,505,446	1,838.1	1885-86	6,298,995	1,631.3
1878-79	7.480,648	2.030.4	1886-87	6,439,009	1,618.2

The weight of hogs packed in the season just past was less than that of any season since 1876-77, with the single exception of the season of 1883-84, being 0.8 per cent. less than last year, and 20 per cent. less than in 1878-79, when the amount packed was greater than in any other year before or since.

Of course, the amount of packing very largely depends on

the corn crops, and the packing following a light corn crop will also be light; but owing to the increase in summer packing it is difficult to draw a comparison which would not lead to conclusions in a certain degree erroneous. For instance, the corn crop in 1885 was 1,936.2 million bushels, and in 1884, 1,795.6 bushels; but the weight of hogs packed in the winter season of 1885–86 was only 1,631.3 million pounds, as against 1,721.7 million pounds in 1884–85. The number of hogs packed in the summer season of 1885–86 was, however, 5.6 millions, as against 5.0 millions in the previous summer, an increase of 12 per cent. in the number of hogs packed. This difference would possibly be changed by the difference in the average weight per hog in the two seasons, regarding which we have no information. It must also be remembered that when two or three light corn crops follow in succession, the stock of hogs is very materially reduced, and cannot be replenished in one season.

The average gross weight per hog was smaller this year than it was in any of the previous years, viz.:

1872–73	290.5	1887–78	282.6	1882 83	267.0
1873–74	268.7	1878–79	271.4	1883–84	251.4
1874–75	262.2	1879–80	266.2	1884–85	266.5
1875–76	272.1	1880–81	259.6	1885–86	259.0
1876–77	269.9	1881–82	262.7	1886–87	251.3

The average weight this year was 3 per cent. less than last year, and 13.5 per cent. less than in 1872–73, the season when the average weight was greater than in any other year.

The average cost per 100 pounds gross weight this year was $4.21, as against $3.66 last year. This difference of 55 cents per 100 pounds on the total amount packed during the season this year amounts to $8,900,000, a very considerable portion of which must have reached the producers. Therefore, if there was anything above cost in raising hogs the previous year, the producer must have secured a fair profit on this year's business.

The numbers packed at each of the seven leading packing centres have been:

	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.
Chicago	2,501,285	2,943,115	2,525,219	2,781,664	2,368,100
Kansas City	188,344	116,038	195,600	339,638	345,817
St. Louis	509,540	629,261	577 793	474,159	316.379
Milwaukee	371,982	444,221	340,783	325.729	323 619
Cincinnati	632,362	628,584	534,559	522,465	384,878
Indianapolis	270.150	472 435	364,021	388,763	249,178
Louisville	279,444	187,506	231,259	231,569	131.007
The seven	4,753,047	5,416,180	4,769,234	5,063.087	4.118 978
Other places	1,752,399	2,064,468	2,181,217	1,856,369	1,678,782
Total	6 505,446	7,480,648	6,950,451	6,919,456	5,747,760

	1882 83.	1883–84.	1884–85.	1885–86.	1886–87.
Chicago	2,557,823	2,621,384	2,368,217	2,393,052	1,844 189
Kansas City	445.374	427,162	606,787	656,109	768,539
St. Louis	327,004	382,222	442,087	369,130	370,866
Milwaukee	293.510	255,467	338.645	343.423	352.148
Cincinnati	425 400	365,451	385,435	3 2,696	331,401
Ind'apolis	276,017	274,' 95	316,971	290,500	3 7,255
Louisville	122.812	141,704	164 912	122,261	198,883
The seven	4,450,940	3 867,485	4,621,054	4,507.171	4,193,231
Oth-r pl'ces	1,684,272	1,534,579	1,839.186	1.791,824	2,245,778
Total	6,132,212	5,402,064	6,460,240	6,298,995	6 439,009

The number of hogs packed at Chicago during last winter is less than for any previous winter, being 8.3 per cent. less than in 1883-84, when the number packed at Chicago was smaller than during any other year previous to this year.

The business at Kansas City was larger than ever before, exceeding last year's packing by 17 per cent.

The *percentage of the total* packed at each place has been:

	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.
Chic.	38 5	39.4	36.3	40.2	41.2	41.7	37.2	36.7	38.0	28.8
Kansas City	2.9	1 6	2.8	4.9	6 0	7.3	7.9	9.4	10 4	11.9
St. L.	7 8	8 4	8 3	6.8	5.5	5.3	7.1	6.8	5.9	5.7
Mitw'ke	5.7	5.9	4.9	4 7	5.6	4 8	4.9	5.2	5.5	5.5
Cincin.	9.7	8.3	7.7	7 6	6 7	7.0	6.8	6.0	5.3	5.1
Ind'plis	4.2	6.3	5 3	5 6	4.3	4.5	5.1	4.9	4 6	5.0
Louisv.	4.3	2.5	3.3	3.4	2 3	2.0	2.6	2.5	1.9	3.1
The seven	73.1	72.4	68.6	73.2	71.8	72.6	71.6	71.5	71.6	65.1
Other places	26.9	27.6	31.4	26.8	28.4	27.4	28.4	28.5	28.4	34.9
Total	100 0	100 0	100.0	100 0	100.0	100.0	100.0	100.0	100.0	100.0

While Chicago's percentage of the total amount packed was very much smaller in the season just passed than ever before, its lost business does not appear to have been diverted to any one prominent packing town. It is true that Kansas City's percentage was 11.9, as against 10.4 in the previous season, but this is not in excess of the annual rate of increase of that point for the last nine years. It has always been considered that the growth of the Kansas City packing industry was in consequence of the natural increase in the hog production of the far West: and that St. Louis was the point that suffered most from Kansas City competition. The percentage of Louisville (3.1 per cent.) was larger than its percentage in any winter since 1880-81. There was a trifling increase in the percentage of Indianapolis as compared with its percentage in the preceding winter, and a slight decrease in the percentages of St. Louis and Cincinnati. The proportion of the aggregate for the season packed at the minor points (34.9 per cent) was larger than ever before; and nearly 80 per cent. of the increase was in the quantity packed at points in Iowa, Nebraska and other states west of the Mississippi. Nebraska packed 400,000 hogs last winter, as against 195,000 in the previous season, an increase of over 100 per cent. While there can be no doubt that Chicago and Kansas City, for a long time to come will be the leading hog packing points, it is very probable that with the increased production of corn in the far West the slaughtering industries at small points west of the Mississippi will increase in importance.

The average yield of lard per hog last year (33¼ lbs.) was less than in any other winter in the last 15 years, with the exception of 1883–84, when the average was 33¼ lbs. In 1872–73 the average was 40.1 lbs. per hog.

The total number of hogs packed in the West and the aggregate meat product and lard for the year ending with March 1 have been:

Year.	Hogs. No.	Meat products. Million lbs.	Lard. Million lbs.
1886–87	12,083.012	1,619.1	394.1
1885–86	11,203.576	1,577.9	390.7
1884–85	10,519.108	1,497.4	364.4
1883–84	9,183.100	1,289.1	318.5
1882–83	9,342.999	1,355.1	316.1
1881–82	10,551.449	1,408.4	363.8
1880–81	12,243,354	1,694.3	469.8
1879–80	11,001,699	1,556.5	382.0
1878–79	10,858,792	1,579.3	408 7
1877–78	9,048,566	1,308.6	336.6
1876–77	7,409,174	1,068.4	243.9
1875–76	6 142.478	900 4	208.8
1874–75	6,766,670	955.2	221 9
1873–74	6,529,116	958.7	222 6
1872–73	5,915,814	947.5	232.2

The Coupler Tests at Burlington.

These tests began Wednesday, the 27th inst. There were present Wm. Forsyth, Mechanical Engineer: W. C. Brown, Superintendent Iowa Division; O. E. Stewart, Assistant Superintendent; Joel West, Master Mechanic, all of the Chicago, Burlington & Quincy; Robert Miller, Assistant General Superintendent, Michigan Central; W. V. Perry (Perry coupler), W. W. Hanscom (Hanscom brake), Frank Moore (Westinghouse brake), and H. C. Buhoup (Janney coupler). On the first day, the Janney, Ames and Perry couplers were tested, each with eight stops at 20 and 40 miles. The tests were made on a level and on a 56-foot grade. The average shocks indicated by the slidometer were for the Janney 2½ in., Ames 7¼, and Perry 10¼. The tests continue.

The New York *Evening Post* of the 25th inst. contains a valuable study of the immigration of skilled labor. It says:

Of the forty different callings classed in the Treasury tables as skilled, sixteen may be deducted as non-mechanical. To prevent error, and forestall criticism by showing how the final figures are obtained, these sixteen occupations are named: Accountants, bakers, barbers, blacksmiths, butchers, carpenters and joiners, clerks, dressmakers, gardeners, mariners, masons, millers, painters, seamstresses, shoemakers, and tailors. To make every allowance in favor of the other side, one or two occupations, like stone-cutting, are retained among the skilled. The result is as follows:

	Total skilled.	16 callings as above.	Per cent
1873	48,792	27,347	56.05
1878	16,531	9.511	57 54
1882	72.664	43.605	60.00
1886	36,522	21.546	59 00

In other words, the proportion of the immigration which we have accounted to be unskilled or non-mechanical labor has almost steadily increased since 1873, pointing apparently to a decline in the attractions which the United States offers to the really skilled labor of Europe.

This fact is more significant when viewed in the light of the distribution of immigration to various sections of the country. The source of information, the statistics of the report of the Commissioner of Emigration for New York, is necessarily untrustworthy, since cheap rates to competing points often induce the immigrant to buy his railroad ticket (in Europe) to a point which is not his destination, and in addition to this disturbing factor, nearly one-third of the arrivals at Castle Garden are credited to New York state, because remaining temporarily in this city.

Nevertheless, one may assert that the South obtains considerably less than 5 per cent., and the trans-Mississippi states hardly more than 25 per cent. of immigrants landing at this port. Perhaps two-thirds of this vast body of laborers seek employment in the older states, although no doubt many of them sooner or later reach the further West. We present all these estimates, however, with some hesitation, since the data are so imperfect; accurate statistics are yet wanting.

Experience is, in many respects, the most satisfactory school, even if the head-master and sub-tutors are somewhat addicted to harsh methods on occasion. An express train on the New York, Lake Erie & Western ran off the end of a derailing switch at the Passaic (N. J.) Bridge on Saturday last and necessitated the employment of 483 temporary "superintendents-of-the-line" for an hour and a half while it was being replaced on the rails (though these consulting experts were, fortunately, gathered from the streets without expense): but the Paterson *Press*, instead of feeling dejected over the "accident," philosophically charges it to the educational department, and in its head-lines gives the chief place to the announcement that "the experiment was a successful one." This is well. What is the use of having safety appliances and never using them? Out in Chicago the other day they threw a $20000* car down a 40 ft. embankment to test a safety beater; and in various directions object-lessons are coming to be quite popular. Perhaps we have here a hint as to the true mission of butting collisions; if some one will only invent a way to make these as harmless as the derailing switch does the drawbridge blunders, it may be found that these instructive occurrences are only just entering upon a lengthy career of usefulness.

The Erie engineman is said to have excused himself on the plea that the "brakes didn't hold" because the track was slippery. This suggests the query whether slippery tracks were ever encountered by him near a drawbridge before now, and faintly brings to mind the old story of the boy who, when he tumbled off a ladder, silenced the derisive remarks of the bystanders with the settler that he "always came down that way."

MILTON, Vt., April 21.—A train of 27 loaded freight cars standing on a side track at Hurley's crossing, on the Central Vermont, with no engine attached, started of their own accord early this morning toward Swanton Junction and overtook and came into collision with a preceding freight train. The grade was heavy, and when the runaway cars overtook the freight they were running nearly 50 miles an hour. Thirty cars were thrown off the track down an embankment into an adjoining field and badly broken up. Brakeman P. H. Flynn was hurt, but not seriously.

Vermont should sell her Green Mountains, or at least borrow a flat-iron and smooth them out. The reporter of the above item makes the bold statement that the railroad company "suffers considerable loss," and even recklessly asserts that the freight in the cars was somewhat damaged; which we will believe, to accommodate him; but if the car bodies had only been made of steel armor plates and the goods packed in cork chips, there would have been very little trouble. Why don't the railroads act on the suggestions of "the Press" in these matters of safety? What we started to say, though, was, that if Vermont would only build her railroads on level prairie and run fewer trains on them, this kind of disaster might be averted as neatly as it was on the Burlington & Missouri River in March, 1884, when a similar runaway train, instead of having its will broken in this arbitrary manner, was allowed to run 95 miles unhindered, and led to see the folly of its heedlessness, so that it never misbehaved afterward.

The Chicago, Burlington, & Quincy now paints its well-known trade mark ("Burlington Route" and the name of the road in white letters on a rectangular black ground) on its passenger cars, thus securing a neat superscription for the cars themselves, while carrying out one of the cardinal principles of advertising, that the *name* of the advertiser *in a shape to be remembered* is the first and one of the most important points to be kept before the public.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Chicago, Burlington & Quincy, from Curtis, Neb., 15 miles.

Chicago, Milwaukee & St. Paul, on Kansas City extension, since Jan. 1, 36 miles.

Fort Worth & Denver City, since last reported, 9 miles.

Gulf, Colorado & Santa Fe, in Indian Territory, since last reported, 25 miles.

Silver Springs, Ocala & Gulf, from Leroy to Dunnellon, Fla., since Jan. 1, 12 miles.

This is a total of 97 miles for the week, making 956 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

	Miles.		Miles.		Miles.		Miles.
1887	956	1883	1,971	1879	391	1875	220
1886	577	1882	2,283	1878	367	1874	375
1885	308	1881	9:6	1877	269	1873	654
1884	595	1880	1,096	1876	432	1872	1,070

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Oregon, the Supreme Court decides that where a railroad company has gone upon land and built its track without an agreement with the owner and before instituting statutory proceedings for condemnation the owner cannot claim the value of ties and material placed on the land in the assessment of its value in proceedings subsequently instituted for condemnation of the land.[1]

In Pennsylvania, the Supreme Court holds that a shipper may recover from the carrier charges which he has paid in excess of the legal charges. In this case, however, the shipper failed to recover anything because the difference in rate was counterbalanced by the charge which the carrier was entitled to claim for switching.[2]

In South Carolina, the Supreme Court holds that a road-master has an implied authority to agree to purchase ties and timber on the line of the road, and the company will be bound, even where, unknown to the seller, the proper agent by the rules of the company was prohibited from making such contracts except in writing and under seal.[3]

In New York, the Court of Appeals holds that it has no power to compel a railroad to build a station or freight house, because the needs of the public require it. This case has already in a former issue of the *Gazette* been discussed at length.[4]

Carriers of Goods and Injuries to Property.

In Texas, the Supreme Court holds that a carrier is liable for delay in transporting goods, even though by a special contract he has limited his liability to wilful negligence. In the bill of lading in this case there was a condition that in case of injury to the property transported, the shipper could not recover unless before he removed the property he had given notice of his claim to some officer of the company or its nearest station agent. The Court rules as to this that it is a binding condition only where the carrier shows that there was such an officer within reach of the shipper at the time.[5] In Georgia a railroad company failed to promptly deliver a still-worm transported by it, which was to be used in the manufacture of turpentine. Pending the delay, the still had to lie idle, and the tree-boxes from which the crude gum was gathered ran over for want of barrels in which to deposit it, and much of the gum was wasted. The Supreme Court holds that the shipper is entitled to recover for the loss of the gum and likewise his expense in trying to find the still-worm. The Court also rules in this case that the first carrier is responsible for the defaults of a connecting carrier.[6]

In Montana, the Supreme Court rules that where sparks from a locomotive set fire to adjoining property the railroad is presumed negligent and must prove its innocence if it can. Also that it is as much negligence in a railroad to allow combustible material to accumulate on its track, as to permit sparks to escape from its locomotives.[7]

Injuries to Passengers, Employes and Strangers.

In South Carolina, the Supreme Court applies an old principle to a new state of facts. A traveler bought a ticket from Florence to New Orleans and return. There were certain conditions printed on the ticket which the traveler signed. One of these was that before it would be good to return with, the passenger must write his name and identify himself as the original purchaser to the satisfaction of the

* A decimal point goes in among these ciphers somewhere.

agent at New Orleans, who would stamp it for return passage. When the passenger presented the ticket at New Orleans, the agent said he did not think his signature was like the one on the contract; that he was not satisfied with his identity and refused to stamp it. The conductors on the return trip refused to take the ticket without the stamp of the agent and the passenger had to pay his fare again. He sued the company, but the Court holds that he has no case. He must stand to his contract, which was to "satisfy" the agent of his identity. The agent was not satisfied—the Court could not consider whether he ought to have been. It is like the common case of the tailor and customer. If a tailor agrees to make me a coat which I am not to take unless I am satisfied with it, I may say I am not satisfied and refuse to take the coat, even though I have no possible grounds for refusing—I am the sole judge of that.[9]

In Indiana, the conductor of a train instructed a passenger with his family to pass into a forward car, as the one they were on would be left at a way station. In attempting to do so the family were required to leave the car, which was not in fact left at the station, and the conductor refused to delay the train sufficiently for them to again enter it, and the passengers, by reason of this, were put to great inconvenience, having to go to a hotel and drive to their destination. The jury gave the passenger $700 damages, which verdict the Supreme Court holds is not excessive.[9]

In Pennsylvania, a person riding on a pass when injured was permitted to show that the pass was not a gratuity but was given on a consideration and by a divided court was allowed to recover damages.[10]

The rule that an employé takes upon himself in his service the risks of that service only so far as they are patent to him; and of dangers of which he is ignorant, the employer should warn him, is applied in Indiana, and the Supreme Court holds that where an employé was inexperienced and ignorant in respect to the difference in the construction of deadwoods placed against the platforms of cars, and of the hazard of coupling cars equipped with double deadwoods, which increased the hazard of coupling; that the fact of the employé's want of knowledge was, or by the exercise of care might have been, known to the railroad company, and such company, without instructing or warning the employé of the hazard, required him to make such coupling, and while so engaged he was injured without fault on his part,—these facts present a case where the employer may be liable. It is likewise held in this case that the fact that the injury occurred on Sunday, and that the plaintiff may have been violating his obligations as a citizen of the State, by the performance of the service in which he was engaged when injured, is not a defense against the defendant's failure of duty in requiring an extraordinarily hazardous service from an inexperienced employé without giving him warning of the peril attending the service required.[11] In California, the plaintiff, a boy twelve years of age, was employed by the foreman of the defendant's boiler shops to work in the tool-room, and was instructed to obey the boss of that room. At a time when there was nothing for him to do in the tool-room, the boss sent him to the shop to see if there was anything for him to do there. There he was set to work by the employés on dangerous machinery, and was injured. The Supreme Court holds that the instruction to plaintiff to obey the boss should be construed to refer to employment in the tool-room alone; that the boss was not authorized to send plaintiff to the shop to find work; and that for the consequences of his doing so, or for the careless acts of the other employés in giving plaintiff dangerous work to do, defendant itself was not responsible.[12] In Texas, the Supreme Court decides that where a section foreman in the employ of a railroad, acting under orders from the roadmaster, attempts to straighten a rail by holding it at one end with a crow-bar, and having men lift it up to let it fall across a tie so that it will straighten itself by the force of the fall, knowing at the time that the appliances used were not the proper ones for the purpose, and in so doing receives an injury, he cannot recover.[13]

In Georgia, a boy about 11 years of age, to amuse himself and to steal a ride, mounted on the ledge of the tender of a railroad engine while it was switching to make up a train of cars preparatory to leaving a town, he being there contrary to the wish of the defendant's employés, and remaining notwithstanding their orders to leave, one of the hands on the engine threw threw cold water upon him while thus on the ledge of the engine, and he then jumped and fell under the wheels of the locomotive while it was moving at a rapid rate and was seriously hurt. The jury found the verdict in the company's favor and the Supreme Court refuses to disturb it.[14] In California a trespasser was struck by a train while lying beside the track. The engineer testified that, when approaching the place of the accident, he first saw a bundle of blankets, and kept his eye on it for about half a minute before he saw plaintiff; that he then did his utmost to stop the train as quickly as possible, sounding the whistle, among other things. It was claimed that he should not have sounded the whistle, as, by doing so, he lost time in stopping the train. The Supreme Court holds that the engineer was not negligent, and therefore the road is not responsible.[15] In Illinois, the Supreme Court says: "No one has the right, by his course of dealing or otherwise, to invite confidence and lull another into a feeling of security from the consequences of his own acts, and then, when an injury has resulted to him from simply acting upon the confidence thus inspired, to turn round and say: 'You should have looked out for yourself, and paid no attention to what I said or did.' When a railroad company puts loaded cars upon a side track, for the purpose of being unloaded by the owners of the freight, and such owners, their agents or servants, with the express or implied consent of the company, proceed to remove the freight, the company in such case has no right, without special notice and warning, to run or back a train in upon the side track while the cars are being unloaded. And while in such case those engaged in the work of unloading are not permitted to close their eyes or ears to what comes within the range of these senses, yet they may give their undivided attention to their work, and are justified in assuming that the company will not molest them or render their position hazardous without such notice or warning."[16]

In Michigan the Supreme Court holds that the absence of a flag-man at a street crossing of a railroad is no evidence of negligence on the part of the company, unless the necessity for stationing and maintaining such flag-man at the particular crossing has been determined upon and required by the railroad commissioner. Nor is backing an engine, with tender in front and a train behind the engine, negligence *per se*.[17] The same Court, in another case, decides that attaching a stake to an engine or tender on one railroad track, and extending diagonally across to a car on the other track, for the purpose of shoving the car along by the moving engine, called "staking cars," across a public highway, is not an unlawful act and negligence *per se*.[18]

[1] Oregon R. & Nav. Co. v. Mosier, 13 Pac. Rep., 300.
[2] Nat. Tube Works Co. v. B. & O. R. Co. 6 Cent. Rep., 103.
[3] Walker v. Wilmington, C. & A. R. Co., 1 S. E. Rep., 366.
[4] People v. New York, L. E. & W. R. Co., 6 Cent. Rep., 39.
[5] Missouri Pac. R. Co. v. Harris, 2 S. W. Rep., 571.
[6] Savannah F. & W. R. Co. v. Pritchard, 1 S. E. Rep., 261.
[7] Diamond v. Northern Pac. R. Co., 13 Pac. Rep. 367.
[8] Bethea v. Northwestern R. Co., 1 S. E. Rep., 372. Another ruling in this case is hardly as good law. The condition in the ticket was printed in very small type and the plaintiff urged that he did not notice it and should not be bound by it. But the Court held that the small type made no difference—he was bound by what he put his signature to even if he did not read it. We would point out that in a number of decided cases where restrictive clauses in carrier's contracts have been sustained, the courts have laid particular stress upon the fact that the conditions were not hidden away in small type.
[9] Lake Erie & Western R. Co. v. Acres, 7 West. Rep., 83.
[10] Camden & Atlantic R. Co. v. Bausch, 6 Cent. Rep., 121.
[11] Louisville, New Albany & Chicago R. Co. v. Frawley, 7 West. Rep., 44.
[12] Fisk v. Central Pac. R. Co., 13 Pac. Rep., 144.
[13] Texas & Pac. R. Co. v. Bradford, 2 S. W. Rep., 595.
[14] Branham v. Central R. Co., 1 S. E. Rep., 274.
[15] Williams v. South Pac. R. C., 13 Pac. Rep., 219.
[16] Chicago & Northwestern R. Co. v. Goeb, 7 West. Rep., 689.
[17] Battishill v. Humphrey, 31 N. W. Rep., 894.
[18] Kelley v. Michigan Cent. R. Co., N. W. Rep., 904.

THE SCRAP HEAP.

Pouring Perrier Jouet on a Steel Rail.

The Jeanerette, Abbeville & Western Railroad commenced grading on April 18, near the plantation of Mrs. M. A. Patout, near Jeanerette, La. She and her beautiful daughters, Miss Ada and Miss Rosa, as well as President F. M. Welch and Mr. H. P. Patout, inaugurated the work by throwing some earth on the roadbed. After this part of the ceremony they visited the home of Mrs. Patout, and drank the health of the road in choice champagne.—*New Orleans Picayune.*

There! After such baptism as that, towns should blossom along the line of the Jeanerette road like roses in the leafy month of June. And if Miss Rosa Patout or her sister Ada would just declare semi-annual smiles in place of miserable, fractional dividends, each individual stockholder would doubtless be forever trying to buy up holdings on all sides.

Mann vs. Pullman.

The Mann Boudoir Car Co. is complainant in a suit for $250,000 damages against the Pullman Palace Car Co., charging infringement of patents in the "vestibule" train recently built and run by the latter company. The Mann people allege that they patented the arrangement some years ago.

A Pound of Cure.

All the trains on the Lake Shore & Michigan Southern are to be supplied with "emergency cases"—boxes containing an assortment of bandages, rubber bands, splints and other articles that are needed in the event of an accident.

Indian Wheat Estimates.

The prospect for a large yield of Indian wheat this season are, according to the Indian Department of Agriculture, unfavorable and under the average, promising a decidedly smaller production on the whole than last year. But other grains are yielding well and it is thought the amount for exportation will not be greatly reduced.

Indian Railroads.

Viscount Coop, the Secretary of State for India, in reply to a memorial from the Associated Chambers of Commerce in Great Britain, states that while fully sensible of the value of railways in India and desirous of seeing them speedily extended, fears that with the present low rate of exchange, a serious demand on the resources of the state which might demand additional taxation, if the present system of government guarantees were persisted in, adding, however, that the field for private enterprise is unlimited.

Within the last five years the government of India, directly and through companies, has expended about £35,000,000 for lines of importance for political and commercial purposes, which will also assist to mitigate the effects of famine.

One of the Unanticipated Kinds of Death.

While looking at the wreck of a freight train on the Chicago & Northwestern road near Palatine, Ill., one day last week, five persons were killed by the bursting of a water tank. The tank was a very large one, constructed of upright oak planks, 24 ft. long, 4 in. thick.

No Respecter of Persons.

A despatch from Topeka, Kan., April 26, says: A special train, bearing Lieut.-Gov. Riddle, Secretary of State Allen, Judge Severy, State Auditor McCarthy, and President Low and General Manager Fisher, of the Chicago, Kansas & Nebraska road, was precipitated down a 25-foot embankment on the Atchison Division of the Chicago, Rock Island & Pacific road, one mile west of Horton. The engine was backing, driving the special car "Columbia," when the tender jumped from the track and drew the locomotive after it. The coach followed. The engine turned bottom up, but the engineman was only slightly hurt. Nearly all the passengers, except Mr. Low, were considerably injured, and two of them are confined to their beds.

Sympathy—Not the Dictionary Kind.

It is said that when Alexander Mitchell was a banker in Milwaukee there was once a run on his bank. On the second day of the run an old Scotchman entered the bank, covered with mud, and carrying a pair of saddlebags. He could not gain access to Mr. Mitchell on account of the crowd, but he shouted out to him, holding up the saddlebags: "Aleck, mon, I heard ye hod a roon on yer bank, and I bring ye all I have, mon—$2,000 in gold." The crowd contemplated the old Scotchman for a moment, and then began to drop out of the line, and in less than an hour the run had ceased.—*New York Sun.*

One of Our Girls.

The New York *World*, of April 24, published a picture of Rose Coghlan, the well-known actress, and printed beneath it the name of Mattie Morgans. Then, in a long article, it told a pretty story about Mattie, to the effect that she had clothed her feminine curves and undulations in masculine garb, and with her pretty nose besmeared with coal-dust and oil, had been running an engine on the Naugatuck railroad, in Connecticut, for some months past. In some mysterious way Mattie's sex has been discovered by the officials of the road. She now retires from the company's employ and will shortly be married. According to the newspaper account, Mattie is but 24 years old, and has a blonde bang and blue eyes.

Your Ticket, Sir.

The stockholders of the Lake Shore & Michigan Southern who go over the road to Cleveland, O., to vote at the annual election on May 4 must pay their fares. This is still another "effect of the Inter-state Commerce law."

All Aboard! Whizz! Troy!

The long run of the Chicago limited over the New York Central & Hudson River from New York to Albany, 142 miles, without stop, is to be eclipsed by a 148-mile run without stop from New York to Troy by the "Saratoga limited," soon to be put on the tracks by the same road. This train, to be composed exclusively of drawing-room, buffet and smoking cars, will leave the Grand Central Depot in New York about 2:50 p. m. on Saturdays and arrive at Saratoga at 7:30 p. m. It will make corresponding return time early Monday morning, arriving at New York at 12:30 p. m.

TECHNICAL.

Locomotive Building.

The Rhode Island Locomotive Works are building 4 locomotives for the Seattle, Lake Shore & Eastern road of Washington Territory. They have 17x24 inch cylinders and weigh 45 tons each.

The Lake Shore & Michigan Southern has placed an order with the Pittsburgh Locomotive Works for two 90,000-pound engines, to be used in freight hauling.

The Grant Locomotive Works of Paterson, N. J., have just sent a small locomotive to the Kaiping coal railway in China. This is claimed to be the first locomotive shipped to China from America.

The Mason Machine Works, Taunton, Mass., are now building five engines for the Boston & Maine, and two heavy bogie engines for the Calumet & Hecla Mining Co.

The Car Shops.

Pullman's Palace Car Co. is building a private car for Jay Gould. It will be 70 ft. long, will have 5 apartments, parlor, bedroom, toilet room, observation room and kitchen, and will be called the Atlanta.

The Harlan & Hollingsworth Company, of Wilmington, Del., are building some coal cars for the Kaiping coal railway in China.

Bridge Notes.

The Milwaukee Bridge and Iron Works have been incorporated at Milwaukee, Wis., with a capital of $125,000, for the purpose of manufacturing and constructing bridges; incorporators, Wm. H. Keepers, Augustus P. Riddell, and Edward Morris.

Manufacturing and Business.

The Wagner car door is to be placed on 300 box cars now building for the Southern Pacific, on furniture cars for the Louisville, New Orleans & Texas and on box cars for the Terre Haute & Peoria.

The Dunham Manufacturing Co. of Boston, is having success with the new storm proof car door. Orders have recently been received for coatings to equip 4,300 cars. Several railroad companies are negotiating with the object of equipping their entire systems.

The firm of Bacon, Pike & Co. has been dissolved, and L. R. Millen and C. W. Pike have formed a co-partnership to carry on the business of "Manufacturers of and Dealers in Southern Pine Lumber and Timber," shipping from Savannah and Brunswick, Ga., and Gulf ports under the firm name of L. R. Millen & Co.

The Felber Machine Works are building a 100 horse-power engine for the Rudolph Stecher Cooperage Works, of St. Louis, which were destroyed by fire on the 16th inst. They are also repairing the damaged machinery and furnishing an entire outfit of shafting, hangers, pulleys, etc., in place of that destroyed.

Iron and Steel.

The Clinch Valley Coal and Iron Co. has been organized at Tazewell Court House, Va., with a capital of $10,000,000.

The New York office of the Riverside Bridge and Iron Works has been removed from No. 171 to No. 17 Broadway.

The firm of Lloyd & Symes, of Boston, has been dissolved. The iron, steel and boiler-tube business will be continued by George H. Lloyd, with the same agencies as those held by the late firm.

The wages of the employés at the Belvidere iron mines, Belvidere, N. J., have been increased 10 per cent. without any solicitation on the part of the employés.

The Vulcan Iron Works have orders for their improved car pile-drivers from the Chicago, St. Paul & Minneapolis, the Atchison, Topeka and Santa Fe, and the Chicago, Rock Island & Pacific road.

Graff, Bennett & Co. are putting a new puddling furnace in operation at their Clinton mill, at Pittsburgh, Pa., which will much increase the output. It is 7 ft. long, while the present furnace is only 4½ ft. long. It will be possible to make two tons instead of one ton of muck iron in a turn of five heats, making each charge about 1,000 pounds. The saving in cost of production will amount to $1 a ton.

The Susquehanna and Columbia iron companies, of Columbia, Pa., have granted the demand of their puddlers, heaters and roll hands for an increase in wages from $3.75 to $4.05 per ton for puddling. All ton men will be paid on the same scale.

The Iron Ore Mining Co. has been incorporated in Minneapolis, Minn., with a capital stock of $1,000,000. The incorporators are: Edwin W. Hand, Marcus V. Little, Fred H. White, Eugene J. Swan, all of Minneapolis.

The Rail Market.

Steel Rails.—No business is reported in the East, except a lot of 6,500 tons for the Pennsylvania Railroad. One of the Eastern mills has announced $38 as its price at the mill.

Old Rails.—Market quiet, only one sale of a 1,000-ton lot being reported. Tees, $22@$22.25; Double Heads, $22.50@$23.

Scrap.—Market very dull with yard lots of domestic at $23@$23.50; foreign, spot, $22@$22.50, and foreign for shipment, at $20.50@$21, and spot $21.50@$22.

Rail Fastenings.—Spikes, 2.50@2.70c. delivered; angle fish bars, 2.20@2.25c.; steel angle bars, 2.25; bolts and nuts, 3.15@3.20, and bolts and hexagon nuts, 3.30@3.40.

A New Sound Steamer.

The Old Colony Steamboat Co. has just given orders for the construction of a new steamer, which is to be larger, and, if possible, better than the "Pilgrim." It is to be called the "Puritan" and will, it is said, be two years in building.

Poughkeepsie Bridge.

The New York Senate has passed the bill extending for one year the time for building the bridge across the Hudson River at Poughkeepsie.

A New Military Road for Germany.

The report of the German war office recommending the construction of a second military railway to the French frontier has been approved by the government. Orders for the immediate construction of the new road were issued on April 25, and work will be rapidly pushed. The whole of the surveys were completed by military engineers before the report was submitted to the government. It has also been decided to build a military road to Swiss territory.

Steel Trade Statistics for 1886.

The annual statistical report of the American Iron and Steel Association has just been completed. Following is a summary of it:

"Production of pig iron, net tons, 6,365,328; production of spiegeleisen, included in pig iron, net tons, 47,982; production of bar, rod, bolt, hoop, skelp, and shaped iron, net tons, 1,580,337; production of plate and sheet iron, except nail plate, net tons, 420,007; production of iron and steel and combined iron and steel cut nails and spikes, kegs of 100 pounds, 8,160,979; production of steel nails only, kegs of 100 pounds, 2,968,989; production of all rolled iron, including iron nails and excluding rails, net tons, 2,259,943; production of Bessemer steel rails, net tons, 1,783,667; production of open hearth steel rails, net tons, 5,255; production of

iron rails, net tons, 23,679; production of iron and steel street rails, included above, net tons, 48,009; production of Bessemer steel ingots, net tons, 2,541,493; production of open-hearth steel ingots, net tons, 243,250; production of crucible steel ingots, net tons, 80,609; production of blister and patented steel, net tons, 2,651; production of all kinds of steel, net tons, 2,870,003; production of iron blooms, net tons, 41,909; value of imports of iron and steel, $41,630,779; value of exports of iron and steel, $14,885,087; imports of iron ore, gross tons, 1,039,433; production of anthracite coal, gross tons, 32,136,362; total domestic production of coal, gross tons, 106,780,033; miles of railroad completed in 1886, 8,648; total number of miles of railroad Dec. 31, 1886, 137,158; iron and steel ships built in the fiscal year 1886, 26; immigrants in the calendar year 1886, 392,887."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fe, annual meeting, Topeka, Kan., May 5.

Central, of New Jersey, annual meeting, at the office, Jersey City, N. J., May 6.

Chicago, Burlington & Quincy, annual meeting, at Chicago, May 18.

Delaware & Hudson Canal Co., annual meeting, at the office, New York, May 10.

Denver & Rio Grande, annual meeting, at the office, Denver, Col., May 2.

Elmira & Lake Ontario, annual meeting, at the office, New York, May 5.

Fort Worth & Denver City, special meeting, Fort Worth, Tex., June 22.

Lake Shore & Michigan Southern, annual meeting, at the office, Cleveland, O., May 4.

Michigan Central, annual meeting, at the office, Detroit, Mich., May 4.

Missouri Pacific, special meeting, at St. Louis, Mo., May 10.

New York, Chicago & St. Louis, annual meeting, at the office, Cleveland, O., May 4.

New York, Susquehanna & Western, annual meeting, at Jersey City, N. J., May 5.

Norfolk & Western, annual meeting at the office, Roanoke, Va., May 4.

St. Louis & San Francisco, annual meeting, at St. Louis, Mo., May 11.

Vicksburg & Meridian, annual meeting, at the office, New York, May 2.

St. Louis, Arkansas & Texas, annual meeting, Texarkana, Tex., May 4.

Flint & Pere Marquette, annual meeting, East Saginaw, Mich., May 18.

New York & Greenwood Lake, annual meeting, at the office, Jersey City, N. J., May 2.

Puget Sound Construction Co., annual meeting, at the office, Seattle, Washington Ter., May 19.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston, Concord & Montreal, $2.50 per share, payable May 2.

Cincinnati, Indianapolis, St. Louis & Chicago, 1¼ per cent., quarterly, payable in July.

Fitchburg, $2 per share, payable May 2.

Mobile & Montgomery, 3 per cent., semi-annual.

Pullman's Palace Car Co., 2 per cent., quarterly, payable May 16.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.

The *New England Railroad Club* holds its regular meetings at its rooms in the Boston & Albany passenger station in Boston, on the second Wednesday of each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

Western Railway Club.

The regular meeting of the club was held in Chicago, April 20, and was presided over by Mr. L. E. Johnson. The Committee on Interchange Rules presented a report recommending slight changes in rules 3 (Section F. and T.), 4, 5, 6, 12, 13, 14, 15, 16, 17, 20, 22, 25 and 30.

Mr. Meade presented a blue print for a gauge (to be used under Rule 3, Section B) which differs from the present standard in that it gives a definite point for the height of the vertical side of the flange when worn sharp, the leg being lengthened one-quarter inch in order to insert it in a worn tread next to flange.

The next meeting of the club will be Sept. 21.

Boston Railroad Clerks' Association.

Boston railroad clerks to the number of 60 celebrated the anniversary of the first year of the existence of the Boston Railroad Clerks' Association at a banquet last week. Speeches were made by A. A. Folsom, General Manager of the Boston & Providence; by William P. Shinn, Vice-President of the New York & New England, and others.

PERSONAL.

—W. M. Nixon, of the Philadelphia *Record*, has been chosen by the Pacific Railroad Commission for consulting expert accountant.

—Mr. E. A. Van Horne, General Superintendent of the Eastern division of the Rome, Watertown & Ogdensburg, has resigned.

—C. S. Cone has retired from the position of treasurer of the Ohio & Mississippi. He has held the office ever since the organization of the company.

—The Board of Trade of Portland, Oregon, has adopted resolutions of regret at the resignation of C. H. Prescott from the office of Manager of the Oregon Railway & Navigation Co.

—M. E. Ingalls, President of the Cincinnati, Indianapolis, St. Louis & Chicago, was given a dinner by his friends at the Queen City Club in Cincinnati last week. Mr. Ingalls sailed for Europe with his family on April 25.

—The nominations of Isaac V. Baker and William E. Rogers for Railroad Commissioners were withdrawn by Governor Hill, of New York, this week, and William A. Armstrong and James A. Buckbee were renominated.

—Joseph A. Shinn, who was appointed Auditor of the New York & New England this week, has served in various capacities in the passenger and freight departments of the Pittsburgh, Fort Wayne & Chicago. Mr. Shinn arrived home from England this week.

—Ex-Judge Frederick Stevens will represent the state of New Jersey and John F. Dillon the Morris & Essex Railroad Co. in settling the dispute over back taxes, which, it was recently decided, should be left to arbitration. The decision of these gentlemen will be final.

—George A. Parker, a civil engineer, died at his home in Lancaster, Mass., last week. He was well known in railroad circles, and has been connected with several large enterprises in the West and South. He was recently engaged in railroad construction in Virginia. His best-known work was the building of the Susquehanna Bridge.

—William M. Abbott has resigned from the New York, Lake Erie & Western, after a service with that company extending over a period of 20 years. For the past 15 years he has been the chief clerk in the passenger department. He resigns to accept the position of General Eastern Passenger Agent of the New York, Ontario & Western.

—W. W. Clements, the new General Manager of the Baltimore & Ohio lines east of the Ohio River received an ovation at Grafton, W. Va., one day this week, as he passed through that place on an inspection of the road. There were cannon fired, there was an address by the Mayor, an outpouring of the population, handshakings, decorations, and jubilation generally.

—John F. Moulton, a well-known railroad man of Buffalo, N. Y., died in Cleveland, O., this week. He had been President of the Buffalo & Southwestern Railroad, now leased to the New York, Lake Erie & Western, since 1878. He built the Coal and Iron Exchange in Buffalo. He built the Buffalo & Jamestown Railroad, and as the road was too poor to pay him, he assumed a controlling interest. He had been identified with several other enterprises. He was 46 years old.

—A. A. Jackson, who has just been appointed General Superintendent of the New York & New England, was connected with the Pittsburgh, Fort Wayne & Chicago for 25 years, serving in nearly all its departments. Before he went to the New York & New England he was Superintendent of the Low Grade Division of the Allegheny Valley. It is said that he combines administrative ability of a high order, with a thorough knowledge of all the practical details of railroad business.

—General B. F. Coates, the former Receiver and General Manager of the Cincinnati & Eastern, has been the recipient of a handsome present from the employés of the road. General Coates was summoned to the shops in Portsmouth, O., it being reported to him that serious trouble had broken out among the workmen, and that his presence was necessary. On reaching the shops, he went in prepared to reason with the men, but was somewhat taken aback by the good-natured expressions on the faces of all present. He was then presented with a solid silver service.

—T. J. Potter, who resigned the position of Vice-President of the Chicago, Burlington & Quincy last week to become Vice-President and General Manager of the Union Pacific, began his railroad career in 1867 as a lineman in the employ of the Burlington & Missouri River road, and passed from that position to that of Station Agent at Albia, Ia. From 1868 to 1873 he was Claim Agent at Burlington. Then he entered the service of the Chicago, Burlington & Quincy as General Agent at Creston, Ia., and six months later became Assistant Superintendent. In 1878 he became General Superintendent of the Burlington system. Then he became Assistant General Manager, and in 1880 General Manager, soon after being elected Third Vice-President. Three years later he became First Vice-President, with jurisdiction over all the lines controlled by the Burlington east and west of the Missouri River.

—Horatio G. Brooks, founder of the Brooks Locomotive Works, who died at his home in Dunkirk, N. Y., on April 19, was born in Portsmouth, N. H., in 1828. At the age of 18 he entered the shops of the Boston & Maine road, at Andover, Mass. At 20 he was a fireman, and the next year an engineman. In 1856 he was appointed Master Mechanic of the Ohio & Mississippi. Four years later he obtained a like position in the Dunkirk shops, and in 1862 was appointed Superintendent of the Western Division of the Erie. He resigned this position in 1865 in order to become Superintendent of Motive Power for the entire road. In 1869, Jay Gould, then President of the Erie Company, ordered the Dunkirk shops removed elsewhere. Mr. Brooks attested his local patriotism by resigning his position, leasing the deserted shops and taking up a new venture on his own account. The Brooks Locomotive Works were organized that year, and at first had a capacity of one small locomotive per month, Mr. Brooks soon made the establishmeet one of the foremost locomotive works in the world. In 1883, Mr. Brooks founded a night school for the apprentices in his shops, with a system of prizes for proficiency. He had a wide circle of railroad friends, and his death is lamented by them all.

ELECTIONS AND APPOINTMENTS.

Atlantic, Birmingham & Great Western.—At a meeting of stockholders in Montezuma, Ga., the following board of directors was elected: Judge Henry M. Herman, W. M. Tewksbery, New York; W. J. Weeks, of Talbotton; E. B. Lewis, Montezuma; Col Henry D. Capers, Adairsville. The board afterward elected Judge Herman president.

Boston & Providence.—George B. Francis has been made Assistant Chief Engineer.

California Central.—The company has elected the following officers: President, George O. Manchester, of Boston; Vice-President, C. W. Smith, of Topeka, Kan.; directors, George O. Manchester, C. W. Smith, H. L. Drew, of San Bernardino; E. S. Babcock, Jr., and O. L. Slough, of San Diego; C. E. French, of Santa Anna; A. W. Francisco, George H. Bonebrake, F. Cronk, Anson Brunson and M. L. Wickes, of Los Angeles, Cal.

Chicago, Madison & Northern.—The directors are James C. Clarke, Stuyvesant Fish, Edward H. Harriman, Sidney Webster, Benjamin F. Ayer, Edward T. Jefferoy and John C. Welling.

Chicago, Milwaukee & St. Paul.—F. S. Atkins has been appointed Assistant Superintendent of the Northern Division of this road in place of C. P. Utley, resigned.

Chicago & Northwestern.—Clarence C. Spooner has been appointed Train Despatcher at Escanaba, Mich.

Chicago Terminal Railway & Transit Co.—The incorporators of this company are Eli H. Cloud, Thomas Caton, John Gray, Henry W. Leman, and Amos W. Martin, all of Chicago.

Cincinnati, Jacksonville & Mackinaw.—T. C. M. Schindler has been appointed General Freight and Passenger Agent of the Michigan Division at Toledo, O. John Van Liew has been appointed to a corresponding position for the Ohio Division at Van Wert, O.

Cleveland & Southwestern.—The incorporators of this new Ohio company are: Donald McNaughton, Frank B. Swayne, Walter R. Woodford, Harry E. King, and Birchard A. Hayes.

Dardanelle & Little Rock.—The board of directors of this new Arkansas company is made up as follows: J. K. Perry, James Evans, Thomas Cox, G. S. Cunningham, G. L. Kimball, W. H. Gee and L. C. Hall, of Dardanelle; D. G. Jones, J. B. Miller, L. H. Jones, John G. Fletcher, and Max Hill, of Little Rock.

East Tennessee, Virginia & Georgia.—Sol. Haas has been appointed Traffic Manager.

Erie Dispatch.—M. S. Robinson has been appointed Car Service Agent, with office at Chicago, Ill.

Hannibal & St. Joseph.—D. H. Wintore has been appointed Assistant Superintendent of this and the Kansas, St. Joseph & Council Bluffs road, to succeed A. B. Barnard, resigned.

Housatonic.—Vice-President William H. Stevenson was chosen General Manager by the directors at a meeting last week.

Little Rock Belt.—The incorporators are: John B. Jones, of Little Rock; James K. Riffel, of Kansas City; John S. Braddock, of Mount Vernon, Ohio; P. Raleigh and E. W. Kimball, of Little Rock.

Louisville, Evansville & St. Louis.—T. Z. Dunn has been appointed Chief Engineer at New Albany, Ind., and W. S. Martin Master of Transportation.

Milwaukee, Lake Shore & Western.—D. M. Philbin has been appointed Agent of Ore Docks at Ashland, Wis.

Milwaukee & Northern.—H. J. Bergemann has been appointed Traveling Passenger Agent.

Mississippi River & Northwestern.—W. B. Dutton has been appointed General Manager of this road, with headquarters at Arkansas City, Ark.

Mississippi & Tennessee Rivers.—This company reorganized in Corinth, Miss., last week by electing C. B. Howery, of Oxford, President; C. W. Robinson, of Meridian, Vice-President; J. D. Bells, of Corinth, Attorney. Vacancies in the charter membership were filled by the election of W. T. Adams, D. J. Ayreman and C. W. Robinson.

New York & New England.—At the meeting of the directors, this week, S. V. White was elected to fill a vacancy in the directory, left by the resignation of H. Victor Newcomb, and G. W. Landers, of Connecticut, was chosen to fill another vacancy.

A. A. Jackson has been appointed General Superintendent. Joseph A. Shinn has been appointed Auditor; R. E. Evenson, Superintendent of the Eastern Division.

New York, New Haven & Hartford.—W. E. Chamberlain, late Superintendent of the Providence & Worcester, has been appointed Superintendent of the Harlem River branch. The office is a new one. E. G. Allen, now Superintendent of the Eastern Division of the New York & New England, has been appointed Superintendent of the Shore Line Division of the New York, New Haven & Hartford. W. A. Waterbury, who has been Superintendent of the Shore Line and Air Line Divisions, will give up his supervision of the former, and will have charge of improvements to be made on the Air Line Division.

W. H. Turner, late General Superintendent of the New York & New England, has been appointed Superintendent of the New York division of this road.

New York, Ontario & Western.—William M. Abbott has been appointed General Eastern Passenger Agent.

New York, Pennsylvania & Ohio.—At a meeting in London recently the English first-mortgage bondholders re-elected Sir George Balfour, the Rev. J. Lockington Bates and Sir Charles Tennant as their trustees; and the second-mortgage bondholders elected Henry Cecil Raikes M. P.

Northern Pacific.—W. T. Small, late Superintendent of Motive Power of the Western Division, succeeds G. W. Cushing as Superintendent of Motive Power of the Northern Pacific system.

Ohio & Mississippi.—Robert Reid has been elected Treasurer of this company in place of C. S. Cone, resigned.

Philadelphia & Reading.—G. W. Cushing, late Superintendent of Motive Power of the Northern Pacific, has been appointed to that position on the Philadelphia & Reading.

Poughkeepsie Bridge Co.—The directors have elected the following officers: W. W. Gibbs, President; N. VanBenthuysen, Vice-President; W. R. Carlisle, Secretary and Treasurer, and P. P. Dickinson, Chief Engineer.

Rome, Watertown & Ogdensburgh.—H. T. Carter has been appointed Acting General Traffic Manager, to fill the vacancy left by the resignation of J. F. Maynard.

St. Louis & San Francisco.—F. D. Russell has been appointed Assistant General Freight Agent in place of S. R. Taylor, who has been compelled to resign on account of illness.

San Juan.—The incorporators are: Edward R. Murphy, Joseph W. Gilluly, Robert F. Weittree, Andrew S. Hughes and William R. Marshall, all officials and employés of the Denver & Rio Grande.

Seattle & West Coast.—The trustees of this new company in Washington Territory are Henry Crawford and Henry Crawford, Jr., of Chicago, Ill., Daniel H. Gilman, Seattle; Thos. Burke, Seattle; Charles M. Sheafe, Seattle, W. T.

A meeting of the above named trustees was held last week and the following officers elected: Henry Crawford, Jr., President; Henry Crawford, of Chicago, Ill., Vice-President; W. J. Jennings, Secretary and Treasurer.

Southern Kansas, of Texas.—The directors have elected W. B. Strong, President; C. W. Smith, First Vice-President; A. A. Robinson, Second Vice-President; E. Wilder, Secretary and Treasurer.

South Pacific Coast.—John Sedgwick has been appointed Freight Agent.

Staten Island Rapid Transit.—At stockholders' meeting this week the following directors were elected: J. F. Emmons, H. Bull, H. Holton Wood, A. B. Boardman, James M. Davis, Edward Curry, Thomas M. King, D. H. Bates, E. A. Leslie, C. S. Sedgwick, F. S. Gannon, A. C. Rose and C. P. Craig. The election of officers was deferred until a later date.

Toledo, Ann Arbor & North Michigan.—At the meeting in Toledo, O., last week, the following directors were elected: J. M. Ashley, Toledo, O.; A. W. Wright, Alma, Mich.

Henry W. Ashley, Toledo, O.; David Robison, Jr., Toledo, O.; William Baker, Toledo, O.; John Cummings, Toledo, O.; O. T. W. Childs, Toledo, O.; J. M. Ashley, Jr., Toledo, O.; S. Dean, Ann Arbor, Mich. The directors elected officers as follows: J. M. Ashley, President, Toledo; A. W. Wright, First Vice-President, Alma, Mich.; Henry W. Ashley, Second Vice-President, General Manager, Toledo; D. M. Monjo, Acting Auditor, Toledo; B. F. Jervis, Treasurer, Toledo.

Union Pacific.—T. J. Potter has been made First Vice-President and General Manager of this road and the Oregon Railway & Navigation Co., which was recently leased to the Union Pacific. Mr. Potter's headquarters will be at Omaha.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—It is reported from Boston that the company is at work through its proposed Southern Kansas lines and other extensions in establishing a great cut off in its transcontinental line, and it is said that in less than a year it will be operating a line from St. Louis to Albuquerque, N. M., which will be wholly independent of, and 125 miles shorter than, the present main line from Kansas City. The best information obtainable is that the Atchison will no doubt go into St. Louis, but there is no confirmation of the reported cut off.

This week it is reported that preparations are making for the consolidation of this road with eight Southern California lines into one system, to be known as the California Central. It is said that this will be consummated about July 1, and will include all Southern California roads except the California Southern. General Manager Smith has positively denied that the Atchison Company intends building to San Francisco.

Atlanta & Charlotte Air Line.—A system of freight car robbery has recently been discovered on this road. None of the railroad employés are connected with it. It is the work of a gang of thieves which has been organized for several months. The method of the robbers was to conceal themselves in the freight cars some distance from Greenville, S. C., and throw out the goods at Greenville fair grounds. Several arrests have been made. The worth of the stolen goods is said to be $5,000.

Attica, Anderson & Western.—Articles of incorporation filed in Indiana. The proposed line will run through Madison, Hamilton, Boone, Warren, Montgomery and Fountain to near West Lebanon, in Warren County, where it will join the Chicago & Indiana Coal road, and be run in connection with it.

Baltimore & Ohio.—It is reported that the Ives-Traynor option for the purchase of this road has been extended 30 days from the date of its expiration under the first agreement, April 25. It was also announced this week that the company will build its line to New York and that it will commence work in a very short time.

Baltimore & Ohio Telegraph.—A decision has been rendered in the Louisiana Supreme Court in the case of the Baltimore & Ohio Telegraph Co. against the Louisiana Western Railroad Co., reversing the judgment of the lower court and dismissing the suit. The Baltimore & Ohio Telegraph Co. sued the Morgan & Louisiana Western, and succeeded in maintaining its line from New Orleans to Lafayette along the line of the roads, the Supreme Court deciding in favor of the Baltimore & Ohio Co. on appeal. The suit was then brought in the parish of Calcasieu to expropriate. The suit was contested and removed to the United States Court on the petition of the Western Union Telegraph Co., made defendants. Another suit for expropriation was brought by the Baltimore & Ohio at Lake Charles, in Calcasieu parish. The Western Union Co. intervened, and one of the objections urged was that the suit could not be tried in vacation of the Court, but only in term time. The lower court overruled the objection, and judgment was rendered in favor of the Baltimore & Ohio, giving them the right of way. The decision, as stated, reverses the judgment of the lower court and dismisses the suit.

The New York office of the Baltimore & Ohio was removed this week from 63 Broadway to the corner of Broadway and Canal street.

Bangor & Piscataquis.—At a meeting of the directors in Bangor, Me., last week, it was decided to lease the Penobscot Central road when built for a sum not to exceed $25,000.

Belt, of Chicago.—A syndicate representing this company, whose road is to connect all roads entering Chicago, has bought 250 acres of land in the northeastern suburbs of Joliet, Ill., on which to build transfer depots, elevators, stock yards and car shops. This purchase is in furtherance of a project to make this the chief transfer points for east and west freight instead of Chicago.

Boston & Albany.—The Electrical Accumulator Co., of New York, has entered suit against this railroad company, claiming that the use of the Julien storage battery, which is being tried on that road, is an infringement of its patents.

Boston, Concord & Montreal.—This company has filed a bill in equity to set aside the lease of the road to the Boston & Lowell.

Boston & Lowell.—The company has issued a circular to its conductors, enginemen and other employés on its White Mountain Division in which notice is given that the company intends to hold on to the Boston, Concord & Montreal road and its branches until the lease of the same shall have been judicially declared void. The circular orders all employés to "use strict vigilance in the property" and to resist all attempts of any individuals to obtain possession of such property, and, if necessary, to use force against any party who undertakes to interfere with the property of the Boston & Lowell Co. The employés are assured of the protection of the company in the carrying out of these orders.

Boston & Maine.—A revised passenger tariff to go into effect May 1 has been issued. Heretofore the rates on different divisions and branches have been very unequal, ranging from 2 cents and less per mile up to five and six on the most northerly portions of the road. The new list is therefore chiefly an equalization, though many rates are considerably reduced. It is on the basis of 2 cents per mile between Boston and Reading and 3 cents on all other portions of the road.

The bill authorizing this company to purchase the Eastern road and certain other roads was defeated in the Massachusetts House of Representatives last week. It was stated that the plan involved the consolidation of 500 miles of road. The bill was refused a third reading by a vote of 35 to 109.

It is reported that representatives of this company have secured a controlling interest in the stock of the Manchester & Lawrence road, and they will carry the election of directors at the election next month. The Manchester & Lawrence road runs from Manchester, N. H., to the Massachusetts line, 22½ miles, and leases the Methuen branch of the Boston & Maine, 3¾ miles.

Canastota, Morrisville & Southern.—The engineers have begun the surveys for this road. The line, as now projected, is for a road 30 miles long, connecting the New York, Ontario & Western at Earlville, N. Y., with West Shore, at Canistota, Milton Delano, of Canistota, is chairman of the committee which has charge of enterprise.

Chatham & Harwich.—The survey of this road from Chatham to Harwich, Mass., is finished. The increase of the company's stock to $85,000 has all been subscribed, and a second assessment of 10 per cent. has been levied and paid in.

Chattanooga, Rome & Carrollton.—The company has located the terminal point of its road at Chattanooga, Tenn. The shops will be built there.

Chicago, Burlington & Quincy.—Two contracts were let last week for the construction of extensions in Nebraska. One contract calls for the building of 75 miles of track, a continuance of the Grand Island extension, 200 miles of which were completed last year. The new extension is to be completed by Aug. 1, the work extending westward from what is known as the Two Hundred Mile Post. The other extension will be 50 miles in length, from Culbertson, Neb., to the Frenchman's River. The work of construction will cost between $16,000 and $17,000 per mile.

The company offers a new issue of 40 year 4 per cent. bonds at 98 and interest, for the purpose of extending its lines in Kansas, Nebraska, Colorado, Dakota, and Wyoming. During last year 370 miles of new road were completed. The aggregate amount of bonds to be issued under this mortgage is limited to $20,000 per mile upon 1,500 miles of road, with $10,000 per mile additional for second track when completed. And the issue during 1887 is not to exceed $12,000,000.

The track is laid 15 miles beyond Curtis in Frontier County, Neb., and the road is graded to the Colorado boundary.

Chicago, Illinois & Eastern.—The sale of this road to the Chicago & Northwestern was consummated at St. Paul, Minn., on April 27.

Chicago, Madison & Northern.—Articles of consolidation of the Chicago, Madison & Northern Railroad Co., of Illinois, and the Chicago, Madison & Northern Rail road Co., of Wisconsin, have been filed in Illinois under the above name.

Chicago, Milwaukee & St. Paul.—It has been stated that the company has decided to build from Tomahawk Lake, Wis., 50 miles northward to the state line, thence to the Presque Isle River, and north to Union Bay, Mich., a distance of 50 miles, and from this point a line parallel to the copper range from Union Bay to Houghton, a distance of 75 miles.

Of the 121 miles of track reported last week as completed on the Kansas City extension of this road, 36 miles have been laid since Jan. 1. The General Manager says that the road will be finished to Kansas City some time next August.

Chicago, Santa Fe & California.—A deed of trust and mortgage has been recorded in Illinois, to secure the first mortgage 5 per cent. bonds of this company. The issue is limited to $35,000 a mile on the lines between Chicago & Kansas City.

Chicago Terminal Railway & Transit Co.—Articles of incorporation have been filed in Illinois. The road to be built is to run from different points in Chicago to points on the boundary lines of Cook County, north, northwest, southwest, south, southeast and east of the city, and to connect these lines by a belt system of railroads at different points on each line. Capital, $10,000,000. Principal office, Chicago.

Cleveland & Southwestern.—Incorporated in Ohio. The object is to construct a road from Cleveland to Zanesville, 110 miles, passing through the counties of Cuyahoga, Medina, Wayne, Holmes, Coshocton and Muskingum. Capital stock, $1,500,000.

Clinch Valley.—Company has been organized at Tazewell Court House, Va., with a capital of $4,000,000. The road will be a branch of the Norfolk & Western.

Columbus, Hocking Valley & Toledo.—The great injunction suit involving $8,000,000 came up in the Chancery Court at Columbus on April 25. A continuance of the case was asked for owing to the sudden and dangerous illness of a son of Judge Burke, one of the defendants. The motion was granted and May 13 set by the Court.

Dardanelle & Little Rock.—Articles of incorporation filed in Arkansas. The road will be built from Dardanelle in a southeasterly direction through the counties of Yell, Perry, Conway and Pulaski to Little Rock, 75 miles. Capital stock, $1,250,000.

East Alabama.—At a stockholders' meeting in Opelika, Ala., last week, the capital stock of the company was increased from $200,000 to $400,000, all of which increase was taken at par. It was voted to extend the road from its present terminus at Buffalo, a distance of 17½ miles, to Roanoke, in Randolph County. The contract for grading has been awarded to H. S. Perkins & Co., of Dunham, Ala., and crossties and trestling to Col. R. J. Trammell, of Opelika. Work on the extension will begin by May 1, and will be completed to Roanoke by Sept. 1. From there it is expected to extend the line to Anniston, Ala.

Far Rockaway.—A company of this name was incorporated in New York last week.

Fort Worth & Denver City.—The track is laid 41 miles north of Quanah and 234 miles from Fort Worth, Tex. There are 2,500 men at work, and the track goes down at the rate of 1¼ miles a day.

Gulf, Colorado & Santa Fe.—This road is finished to its connection with the Atchison, Topeka & Santa Fe. The last spike was driven on April 26 at Purcell, a small station on the Canadian River in the Indian Territory. The last 42 miles of the track was laid in 26 days. Through trains will begin running about May 20.

Kansas City, Memphis & Birmingham.—The crossings of this road with the Mobile & Ohio at Tupelo, Miss., were laid last week and track put down to Old Town Creek. A pile trestle is to be built here one mile in length. Tracklaying toward the Big Warrior River in Alabama will begin by June 1. A connection will have to be built with the Georgia Pacific at Cordova, Ala., so that material may be obtained. The bridge over Big Warrior River will be completed by next September. Freight and passenger trains are now running regularly between Memphis, Tenn., and Tupelo, Miss.

Kentucky Central.—This road was sold on April 23 by its Receiver, H. E. Huntington. The purchasers are the boudholders' committee, consisting of C. P. Huntington, George T. Bliss and E. C. Baldwin. They paid $205,000 for the rolling stock and $1,300,000 for the roadbed and leaseholds. There will be a reorganization under a plan which contemplates the replacing of the mortgage for $6,400,000 drawing 6 per cent., for a new $7,000,000 4 per cent. mortgage. The road extends from Covington, Ky., to Livingston, Ky., with branches to Lexington, Maysville and Stanford. It has furnished a 95-mile link of the Chesapeake & Ohio system since its extension to Louisville and Cincinnati five years ago.

Indianapolis, Decatur & Springfield.—The road is to be sold in New York to the highest bidder on May 25.

Illinois Central.—The city government of Chicago resorted to peremptory measures this week to stop the operations of this road along the lake front. The Mayor ordered the Commissioner of Public Works to inform the company that its work must stop, and it stopped. A squad of police carried out the orders.

Little Rock Belt.—Articles of incorporation filed in Arkansas. The company proposes to build a railroad 9 miles in length. Capital stock, $200,000.

Louisiana North & South.—This new company has decided to begin operations. The road is to extend from the Arkansas line southward by the way of Homer and Gibsland to Alexandria, La. Gibsland is 41 miles from Shreveport, on the Vicksburg, Shreveport & Pacific.

Louisville, New Orleans & Texas.—McDonald & Shea, contractors, have received a verdict of $24,000 against the railroad company. The amount sued for was $60,000, which was claimed to be due from the company for the work of constructing a tunnel for the road below Vicksburg, Miss. The contractors had received $60,000 and sued for $90,000. They will take an appeal.

The company is having a survey made for a new extension to begin near Wilezinski, and terminate at or near Helena, Miss. It is said the road will be completed by Sept. 1.

Louisville, St. Louis & Texas.—Contracts have been let for grading the road between Stevensport and Owensborough, Ky., 45 miles, thus making 88 miles of road now under contract.

Marietta & North Georgia.—The steel rails and rolling stock necessary for changing this road to standard gauge have been ordered. The road runs from Murphy to Marietta, Ga., 100 miles, and is to be extended from Murphy to Knoxville, Tenn., 100 miles. It will also be extended from Marietta to Atlanta, Ga.

Meigs Elevated.—The company has filed in Massachusetts a certificate showing that the whole of its capital stock, $100,000, as required by the statutes, has been paid in.

Mexican National.—The sale of this road under the decree of foreclosure is announced to take place in the city of Mexico on May 23. Over 99 per cent. of the total issue of $24,300,000 is now deposited in London and New York under the plan of reorganization.

Missouri Pacific.—A committee of Fort Smith, Ark., citizens have just obtained a written contract from General Manager Wood, of this company, in which it is stipulated that if the city will donate to the railroad grounds for a union depot, right of way and certain property for machine shops, the construction of the Kansas and New Orleans branches from Fort Smith will be commenced within 60 days, and a bridge built over the Arkansas River for railroad, wagon and passenger travel. At an enthusiastic meeting of Fort Smith citizens last week, one-half the necessary funds was subscribed by a few men. The remainder will be secured in small amounts.

Nascopec.—This road was opened for traffic on April 25. It runs from Nascopec, Pa., on the North & West Branch road to Rock Glen Junction, on the Sunbury, Hazleton & Wilkesbarre road, a distance of 11½ miles. It will be operated by the Pennsylvania road.

Newport, Jonesborough & St. Louis.—The engineers have begun the survey for this new road, which is projected to run from Jonesborough to Newport, Ark., 40 miles. The road will be built as soon as it is located.

New Roads.—Work will begin this week on a new road between Atlantic City and Brigantine Beach, N. J.

Surveyors have commenced locating a new line from Wahpoon to Fargo, D. T., 45 miles.

There is a road projected from Fort Worth, Tex., to White Settlement, 7 miles.

New York, Chicago & St. Louis.—The report of Receiver Caldwell for the six months ending March 31 shows the total receipts, including $942,262 on hand, to be $3,014,659, and disbursements $1,644,098, leaving a balance on hand of $1,370,560.

New York City & Northern.—A reorganization of the company is contemplated. The first-mortgage bondholders have appointed a committee to confer with the other interests on the subject.

New York & New England.—This company has sold its half interest in the stock of the New England Transfer Co. to the New York, New Haven & Hartford.

New York, New Haven & Hartford.—The contract for the grading work on the four tracks between New Rochelle and Rye, has been given to R. A. Malone & Co., of Lancaster, Pa. The work is to be completed by Nov. 1.

Old Colony.—The company is putting in an iron bridge at Mattapoisett, Mass., in place of the wooden one there, which was complained of by the residents as being unsafe. The new bridge is 50 ft. long and 40 ft. high.

Orange Belt.—About 1,000 men are now at work on this road. It is under contract to be finished in November next. It will run from Monroe, Fla., on the Jacksonville, Tampa & Key West road, 5 miles west of Sanford to Orange City.

Oregon Railway & Navigation Co.—The negotiations for the leasing of the company's lines to the Union Pacific Co. were terminated in New York this week. The lease was signed, sealed and delivered on April 25. It is for 99 years, and the rental is 6 per cent. on the stock and bonds. The capital stock is $24,000,000, and there are $5,690,000 of first mortgage bonds, $6,000,000 of debenture bonds and $1,200,000 of scrip certificates. The Oregon & Transcontinental Co., of which also Elijah Smith is the President, does not appear in the lease. It is, however, the owner of about 140,000 shares of Oregon Railway & Navigation stock, which is now guaranteed by the Union Pacific to pay 6 per cent. dividends.

Peninsular Railway of Lower California.—The road will be built from San Diego, Cal., to Ensenada and San Quintin Bay, on the Pacific coast, thence across the peninsular to Angel Bay on the Gulf of California. It is also proposed to build from Ensenada east, crossing the Colorado near Port Isabel, crossing the Atchison, Topeka & Santa Fe's road from Bonsore to Guaymas, and further crossing the Sierra Madre to a connection with the Mexican Central at Chihuahua. The capital stock is $1,000,000, with power to increase to $5,000,000.

Pennsylvania.—The company will soon build additional tracks between Green Tree and Frazer, 2 miles, and Frazer and Valley Creek, 6 miles, on the Philadelphia Division. Additional tracks are to be built on the Middle Division between

Thompsontown and Tuscarora, McVeytown and Manyunk Bridge, Tyrone Forges and Tyrone, and between Juniata Bridge and Tipton, a total of 15 miles. There will be 6 miles of additional track laid on the Pittsburgh Division.

Petaluma & Sebastopol.—The citizens of Petaluma and Sebastopol, Cal., have resolved to incorporate as soon as possible a company of this name to build a standard gauge road between the cities.

Philadelphia & Reading.—A settlement of disputed accounts between the Central Railrod Co., of New Jersey, and the Reading Co. has been reached. When the Central was leased to the Reading in May, 1883, both companies were in the hands of receivers, and Chancellor Runyon consented to the lease only on the promise of the Reading Co. to pay the receivership debt of the New Jersey Co., which was called $2,000,000, within ninety days. If payment was not made in that time the lease was to be null and void, and to secure its promise the Reading Co. deposited with the Court $1,000,000 of its new consolidated mortgage bonds, first series, and $2,000,000 second series. The debt was never discharged, but the supplies and material for which the Receiver incurred the debt were appropriated by the Reading. The $1,000,000 first series bonds were sold for the benefit of the New Jersey road some time ago, but an injunction prevented the sale of the remaining collateral. The Central claimed these bonds, but the Reading Co. urged its ownership of them, and set up counter claims for permanent improvements on the leased line. It has now been agreed that the Central shall take the $2,000,000 bonds at par in part settlement of its claims, and that the balance of account shall take its place among the unsecured claims in the proposed reorganization of the Reading Co.

Pittsburgh & Lake Erie.—Cornelius Vanderbilt's attorneys filed a bill in equity in Pittsburgh, Pa., last week against the trustees of this company, seeking to break the trust deed under which a majority of the company's common stock is held, in order that they may vote their stock direct and get actual instead of nominal control of the company. The trustees are David Hostetter, Jacob Henrici, James J. Bennett and William K. Vanderbilt.

Pittsburgh & Western.—A decree of foreclosure was issued in Pittsburgh last week in the case of the Mercantile Trust Co. against this railroad company. An amended bill admitting the allegations was filed by the defendant company and the order and decree of sale was made. The Court fixed $1,000,000 as the minimum price.

Pullman's Palace Car Co.—This company is in court against the Central Transportation Co. Mr. Pullman appeared at the hearing in Philadelphia this week, and, as a stockholder in the transportation company, asked to have that company's directors enjoined from carrying out the resolutions adopted in 1885, under which the par value of the company's stock was reduced from $50 to $38 a share, and the surplus which was deposited to provide for a rainy day was directed to be distributed as a 12 per cent. dividend among the shareholders. The contention was that any such proceeding was illegal and beyond the powers of the directors. The Court held this matter under advisement. The Pullman Co. then asked to have the transportation company enjoined from prosecuting its suit to collect rental at the terms specified in the lease. It asks the Court to find that the rental should be graded in accordance with the earnings.

Republican Valley & Wyoming Valley.—Articles of incorporation were filed in Nebraska this week. The road is to be a branch of the Chicago, Burlington & Quincy and will traverse Western Nebraska, Eastern Colorado and Southern Wyoming, with Culbertson, Neb., and Cheyenne, Wy., as terminial points.

Richmond & Danville.—The offices of this company will be removed from Washington, D. C., to Richmond, Va. This is simply reversing the move which was made last August.

St. Joseph & Grand Island.—D. D. Streeter & Co., of Denver, Col., have the contract for the grading, bridging and fencing of this company's extension of 85 miles, between Fairfield and Alma, Neb.; A. A. De Creet & Co., of Chicago, are the contractors for station buildings and water tanks. It is expected that the extension will be in operation by Nov. 1.

St. Louis & San Francisco.—For more than a week a fight has been in progress over the application of the Oppenheim party for a mandamus to compel the transfer clerk and officers of this company to allow an examination of the stockholders' list and the stock transfer books. On April 25 the Winslow party made a motion for a stay of proceedings in the matter of the mandanus, originally applied for before Judge Donohue, until after their proposed appeal from Judge Donohue's order could be decided. The General Term Judges, who had heard the application, fear a decision denying the motion for the stay.

St. Paul, Minneapolis & Manitoba.—Secretary Lamar has overruled the action of Commissioner Sparks in regard to surveys in the Devil's Lake district in Dakota which have been suspended for a year, and has ordered the approval of the surveying contracts. This throws the district open for settlement. The Manitoba road is already built through this section.

San Juan.—Articles of incorporation under this name have been filed in Colorado by officials of the Denver & Rio Grande, to build seven branches from various points on the line of that road in the state of Colorado.

Seattle & Eastern.—George D. Hill has received the contract for clearing the right of way and constructing the roadbed of 30 miles of this road in Washington Territory.

Seattle, Lake Shore & Eastern.—This company of Washington Territory is ordering equipment in the East. The Rhode Island Locomotive Works are building it 4 locomotives, and a contract has been given at Wilmington, Del., for 2 passenger coaches and 1 combination baggage car. The rails for the road are now on the way from England

Seattle & West Coast.—Articles of incorporation filed in Washington Territory. The company will build and equip a railroad and telegraph line from Seattle, W. T., by the most practicable route to a point on the boundary line of the United States and British Columbia, and will connect with the Canadian Pacific. The survey has already been made from Seattle to Snohomish, about 30 miles. There have been 1500 tons of steel rails bought from the Moss Bay Hematite Iron & Steel Co., of Workington, England, and these are now on their way to this country. Everything will be ready for the contractors within two weeks, and the grade will be completed ready for the rails upon their arrival. Capital stock of the corporation will be $1,000,000, divided into 10,000 shares of $100 each. Principal place of business, Seattle, W. T.

Silver Springs, Ocala & Gulf.—This road is completed from Ocala, Fla., to Dunnellon, 25½ miles. A double daily service has been put on the line. Arrangements are being made for a line of steamers on Withlacoochee River, connecting with the road at Dunnellon.

Toledo, Ann Arbor & Northern.—An interesting experiment is to be tried by this company—a plan of profit sharing, of which the employés of the road will be beneficiaries. The details of the scheme were worked out by President Ashley. At the recent annual meeting the stockholders voted to give it a trial.

Tombigbee.—The election in Columbus, Miss., this week, to decide whether or not the city should give $100,000 to this road, resulted in an almost unanimous vote in favor of the gift. The road will be built at once. It is projected to run from Columbus, Miss., to some point on the Tennessee River, passing through the Warrior coal fields and connecting with the Kansas City, Memphis & Birmingham road.

Troy & Boston.—C. W. Tillinghast, one of the trustees of the $1,500,000 mortgage on this road, has authorized counsel to begin foreclosure proceedings. It is said that the suit will not interfere with the consolidation of the road with the Fitchburgh, which is to take place on May 3.

The stockholders meet on April 30 to ratify the transfer of the control of their line to the Fitchburg Co., and the latter corporation will take possession on May 2.

Vicksburg & Meridian.—The company has decided to build a branch to Brandon, Miss.

Williamsburg & North Adams.—Leave to withdraw was reported last week by the Railroad Committee of the Massachusetts Legislature on the petition for reviving the charter of the Williamsburg & North Adams Railroad Co. Representative Crosby gave notice that he should move a substitute bill.

Winnipeg & Hudson Bay.—The route of 650 miles from Winnipeg to Port Nelson on Hudson Bay is laid out and one division of 40 miles of road is now being finished. Construction work will be continued and the road completed in 2 years.

Wheeling & Lake Erie.—This road has changed ownership. It is stated that the majority interest which has been owned by the heirs of the late Commodore Garrison, was bought this week by Signey Dillon, of New York. The road, when projected, was intended to connect Toledo, O., with Wheeling, W. V., but it was only completed from Toledo to Bowerstown, 40 miles west of Wheeling, which city is reached by a connection with the Pittsburgh, Cincinnati & St. Louis. It is asserted that under its new control the road will be extended to Wheeling and a branch built to Cleveland, O.

Wyoming, Colorado & Pacific.—Incorporated in Wyoming. The proposed road will begin at the southern boundary of Wyoming to Cheyenne and through Wyoming. Principal office, Cheyenne. Capital stock, $1,000,000.

TRAFFIC AND EARNINGS.

The Inter-state Commission.

The Commission has made an order suspending the fourth section of the law for 75 days as applied to transcontinental roads, but subject to a revocation and with a proviso that intermediate rates shall not be raised above those in force on April 20. This applies to the Northern Pacific, Southern Pacific, Atchison, Topeka & Santa Fe and St. Louis & San Francisco.

Secretary Moseley, of the Inter-state Commission, received the following telegram on April 27:

Am advised Union Pacific is not included in suspension of section 4 of Inter-state act in favor of Transcontinental lines. Omission must be accidental, as of course Commission could not intend to exclude one line from suspension which includes all others. I understand we were not represented at application. This was an accident which has not been explained. * * * What immediate steps can be taken to have Union Pacific included with other Transcontinental lines?

CHARLES F. ADAMS.

This telegram was forwarded to the Commission at Atlanta, Ga., and the Secretary received instruction to say that the Union Pacific may make application to the Commission at Atlanta.

The Commission has sent a letter to Charles P. Clark, President of the New York, New Haven & Hartford, in reference to the petitions presented by him in behalf of the various roads of southern New England for the suspension of the short haul clause. The letter said that the Commission would be unable to consider the matter till its return from the South. The letter referred to and inclosed a copy of a protest against the railroads by C. C. Goodrich, General Agent of the Hartford & New York Transportation Co., which requested that his company be given the opportunity to show to the Commission what wrongs are inflicted by the railroad companies at inland points reached by water in case parties competing by water do not combine in price and share the business with the railroads. The matter will rest till after the Southern trip, upon which the Commission started this week.

The Commission has ordered the temporary suspension of the long and short haul as regards passenger traffic on the Rome, Watertown and Ogdensburgh between stations where that road has to compete with the Grand Trunk. Many petitions were sent to the Commission during the past week, asking for the suspension of the short haul clause. Among these were petitions from the Chicago Board of Trade and the merchants of that city and those of San Francisco, from the Manufacturers' Association of California, from representatives of railroad companies, and from manufacturers without number.

The Commission met in Atlanta, Ga., on April 27. A hearing was given to those who oppose the railroads, and favored an enforcement of the fourth section of the law. The New Orleans & St. Louis Steamship Co. and the Southern Pacific Railroad Co. offered a memorial asking that the Commission should rescind its temporary order annulling the long and short haul clause for the Southern roads. The railroads were given permission to present facts in rebuttal of the allegations contained in the memorial.

A paper was presented by the large cotton and fertilizer dealers of Georgia in favor of the enforcement of the fourth section. The Cotton Exchange and Board of Trade of Savannah, Ga., have telegraphed to Judge Cooley asking that Section 4 be enforced.

Cotton.

Cotton movement for the week ending April 22 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c
Interior markets:				
Receipts	7,334	24,267	D. 16,933	69.7
Shipments	19,274	48,741	D. 29,467	60.4
Stock	107,106	271,336	D. 164,230	60.5
Seaports:				
Receipts	14,222	43,960	D. 29,738	67.6
Exports	46,156	52,128	D. 5,972	11.4
Stock	455,446	729,489	D. 274,043	37.5

Total movement from plantations for the crop year ending April 22 was 6,189,454 bales, against 6,190,020 last year, 5,506,890 in 1884-85, and 5,497,232 in 1883-84.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Month of March:				
C., St. L. & P.	$475,521	$384,960	I. $90,561	23.5
Net earnings	99,465	35,945	I. 63,520	182.5
Des. M. & Ft. D.	28,810	31,478	D. 2,668	8.4
Net earnings	8,184	10,161	D. 1,977	19.3
Det., B. C. & Al.	39,769	14,809	I. 24,960	168 6
Net earnings	21,294	8,724	I. 12,570	144.7
Mexican Cen.	392,626	337,474	I. 55,152	16.3
Net earnings	117,726	93,874	I. 23,852	25.4
Nash., C. & St. L.	245,733	187,350	I. 58,383	31.1
Net earnings	97,095	72,470	I. 24,625	33.9
N. Y., Sus. & W.	112,538	89,179	I. 23,359	26.1
Net earnings	58,294	40,960	I. 17,354	42.2
N. Y., L. E. & W.	1,623,178	1,464 950	I. 58,228	10.8
Net earnings	595,046	504,820	I. 90,226	17.8
N. Y., P. & Ohio.	475.300	482,700	D. 7,400	1.5
Net earnings	176,937	168,963	I. 7,974	4.7
Pennsylvania	4,410,433	3,901.855	I. 508,578	13.0
Net earnings	1,435,841	1,305,780	I. 130,061	9.9
Rich. & Peters.	19,628	.....	.....	....
Net earnings	10,735	.....	.....	....
Petersburg R. R.	31,767	.....	.....	....
Net earnings	18,759	.....	.....	....
Total (gross)	$7,803,908	$6,894,755	I. $909,153	13.1
Total (net)	2,609,882	2,241,697	I. 368,185	16.4
Month of February:				
Balt. & Potomac.	$110,528	$94,298	I. $16,230	17.5
Net earnings	32,819	33,323	D. 504	1.5
Buff., N. Y. & P.	184,148	171,522	I. 12,626	7.3
Net earnings	218	28,723	D. 28,505	99.3
Bur., C. R. & No.	195,938	207,384	D. 11,410	5.5
Net earnings	45,847	62,042	D. 16,195	25.9
Cairo, V. & C.	50,766	39,560	I. 11,206	28.5
Net earnings	10,950	2,136	I. 8,814	419.7
Cape F. & Y. Vy.	24,184	19,963	I. 4,221	21.1
Net earnings	11,458	10,329	I. 1,321	11.6
Cen. of Georgia	561,399	479,920	I. 84,479	17.6
Net earnings	226,309	172,823	I. 53,486	30.9
C., I. & St. L.	196,671	199,168	D. 2,496	1.2
Net earnings	75,553	68,901	I. 6,652	9 6
Cl., C., C. & I.	288,415	292.520	D. 4,105	1.4
Net earnings	92,253	83,510	I. 8,743	10.4
Col. & Rome	8,445	7,013	I. 1,432	20.4
Des M. & Fort D.	23,253	30,957	D. 7,704	24
Net earnings	3 358	9.582	D. 6,224	64.8
Det., B. C & Al.	26,083	10,725	I. 15,358	141.6
Net earnings	12,086	5,735	I. 6,351	111.4
E. Ten., Va. & G.	396,283	341,386	I. 54,897	16.0
Net earnings	95,056	120.274	D. 25,218	20.9
Jack., T. & K. W.	60,000	23,885	I. 36,115	151.1
Spart., Un. & Cal.	9,244	10,549	D. 1,305	12.4
Wil., Col. & Aug.	70,130	63,058	I 7,072	11.2
Total (gross)	$2,208,487	$1,991,872	I. $216,615	10.8
Total (net)	607,236	598,507	I. 8,729	1.4
Two months to Feb. 28:				
Balt. & Potomac.	$217,655	$195,389	I. $22,266	11.3
Net earnings	63,800	71,349	D. 7,549	10.5
Buff., N. Y. & P.	373,957	341,335	I. 32,622	9.5
Net earnings	30,735	50,510	D. 19,775	39.1
Bur., C. R. & No.	416,146	385,111	I. 31,035	8.0
Net earnings	100,943	80,468	I. 20,475	25.4
Cairo, V. & C.	108,487	75,036	I. 33,451	44.6
Net earnings	21,326	6,637	I. 14,689	222.5
Cape F. & Y. V.	44,897	37,885	I. 7,012	18.2
Net earnings	23,101	21,227	I. 1,874	8 8
Cen. of Georgia	1,095,128	1,002,987	I. 92,141	9 1
Net earnings	376,971	328,870	I. 48,101	14.6
C., C., C. & I.	602,701	578,253	I. 24,448	4.2
Net earnings	191,563	149,881	I. 41,682	27.7
Des M. & Fort D.	50,376	50,351	I. 25	...
Net earnings	7,305	8,940	D. 1,635	18.3
Det., B. C. & Al.	50,479	21,145	I. 29,321	139.2
Net earnings	22,795	10,215	I. 12,580	123.3
E. Ten., Va. & G.	818,770	665,417	I. 153,353	23.0
Net earnings	296,804	224,218	I. 72,586	32.6
Total (gross)	$3,778,596	$3,352 922	I. $425,674	12.6
Total (net)	1,135,343	952,315	I. 183,020	19.2
Three months to March 31:				
Atch., T. & S. F.	$4,271,883	$3,228,962	I. $1,042,921	32.3
Atlantic & Pac.	545,764	344,933	I. 200.831	58.2
Buff., N. Y. & P.	579,957	546,078	I. 33,879	6.2
Buff., R. & Pitts.	394,002	350,704	I. 43,298	12.3
Bur., C. R. & No.	703,021	627,054	I. 75.967	12.1
Cairo, V. & C.	172,000	123,488	I. 48,512	39.2
California South.	383,110	130,377	I. 252,733	193.8
Canadian Pac.	1,809,139	1,621,581	I. 187,558	11.5
Cape F. & Y. Vy.	67,352	58,844	I. 8.508	14.4
Central Iowa.	338,153	296,892	I. 41,261	13.8
Ches. & Ohio	958,780	872,564	I. 86.225	9.8
Eliz., Lex. & B. S.	220,225	197,193	I. 23.032	11.6
Ches., O. & S. W.	423,047	369,899	I. 53,148	14.3
Chic. & Atlantic.	509,779	346,688	I. 163,091	47.8
Chi. & East. Ill.	465.142	408,048	I. 57,094	13.9
Chi., Mil. & St. P.	5,228,000	5,042,689	I. 185,311	3.6
Chi., St. L. & P.	1,327,718	1,075,797	I. 251,921	23.4
Chi. & W. Mich.	308,131	308,857	D. 726	.2
Cin., H. & Day.	745,673	649,950	I. 95,723	14.7
C., I., St. L. & C.	644,719	623,372	I. 21,347	3.4
Cin., N. O. & T. P.	790,300	649,878	I. 140,422	21.6
Ala. Gt. South.	371,509	289,382	I. 82,127	28.3
N. Orl. & N. E.	177,480	169,564	I. 7,916	4.6
Vicks. & Mer.	139,411	131,937	I. 7,474	5.6
V., Shre. & P.	145,445	118,831	I. 26,614	22.4
Cin., R. & Ft. W.	95,786	84,165	I. 11,621	13.7
Total (gross)	$21,815,535	$18,667,727	I. $3,147,808	26 8
Eight months—July 1 to Feb. 28:	1886-87.	1885-86.		
C., L. St. L. & C.	$1,811,834	$1,619,006	I. $192,828	11.9
Net earnings	718,253	625,969	I. 92,284	14.7
Nine months—July 1 to March 31:				
Nash C. & St. L.	$2,057,256	$1,664,829	I. $392,427	23.5
Net earnings	869,111	667,590	I. 201,521	30.1
Year to Dec. 31:	1886.	1885.		
Pitts., C. & St. L.	$4,752,596	$4,033,623	I. $718,973	17.8
Net earnings	1,621,906	1,351,990	I. 269,916	1.2

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Coal.

The coal movement for the week ending April 23 is reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite	632,428	505,672	I. 123,756	25.0
Bituminous	320,065	170,286	I. 149,779	87.9
Coke (April 16)	88,943	73,212	I. 15,731	21.4

Cumberland coal shipments for the week ending April 23 were 71,839 tons, and for the year to that date 952,264 tons, an increase of 579,157 tons as compared with the corresponding period of last year.

The coal tonnage of the Pennsylvania road for the week, ending April 16 is reported as follows:

	Coal.	Coke.	Total.	1886.
Line of road	184,325	86,514	270,839	197,352
From other lines	87,985	2,429	90,414	84,414
Total	272,310	88,943	361,253	281,766
Year to date	3,822,770	1,323,604	5,146,344	4,132,805

Increase for the week, 79,487 tons, or 28.2 per cent.; increase for the year, 1,013,539 tons, or 24.5 per cent.

Lake Traffic.

The fleet of vessels loaded at Detroit this spring with grain for Buffalo and other lower lake ports, is the largest that ever cleared from that, or probably from any other lake port, at

the opening of navigation. In a few days the entire fleet will have departed. The wheat cargoes carried by these vessels amount to 1,707,000 bushels, most of which is for Buffalo. The corn amounts to 90,000 bushels, and all goes to Buffalo excepting one cargo.

Southwestern Statistical Bureau.

The general managers of the roads heretofore forming the Southwestern Railroad Association have decided to continue the association as a statistical bureau under the name of the Southwestern Statistical Bureau. J. W. Midgley will be Chairman as heretofore.

Basing Rates.

The Western States Passenger Association has adopted a resolution to use the differential rates now in effect over certain eastern roads by taking those east-bound rates charged by eastern roads from points on the eastern boundary line of the association, and making through rates by adding them to the regular rates of the association.

Central Traffic Association.

The General Managers and Passenger Agents began their meeting in Chicago on April 27. The subjects which are to be considered were referred to committees. The Committee on Mississippi River percentages met after the general meeting. Chairman Blanchard said that the Western roads wished to establish a basis of fixed rates on business from the seaboard to the Missouri River, and their proposition was to add the rates from the seaboard to Chicago to the Missouri River rates, thus obtaining the same through rates *via* Chicago to the Missouri River as prevail *via* St. Louis, on the basis of 116 per cent. above Chicago rates.

The committee favored this compromise plan of adjusting the troubles with the Western lines, and went to work arranging a percentage basis from the various points in the East.

Passenger Rates in Michigan.

The Michigan Legislature is endeavoring to arrange a scale of passenger rates which shall depend upon the earnings of the road to which it is applied. Roads earning over $3,000 a mile are to charge not more than 2 cents; roads paying under $3,000 and over $2,000 can charge 2½ cents; all other roads can charge 3 cents. This would cut only two roads to 2 cents, the Michigan Central and the Lake Shore & Michigan Southern. These companies will carry the question to the courts if the law is passed.

Michigan Crop Report.

The Michigan crop report for April shows that returns have been received from 1,009 correspondents representing 747 townships. Six hundred and sixty-four of these are from 432 townships in the southern four tiers of counties and 132 from 163 townships in the central counties. Correspondents very generally agree that it is yet too early to accurately report upon the condition of wheat, but the weather during March was extremely unfavorable and warrants the expectation that the crop has suffered severely. As usual, wheat on clay and undrained lands and high knolls has suffered most.

Dressed Beef Rates.

The East St. Louis Dressed Beef & Canning Co., by S. W. Allerton, President; Swift & Co., by G. F. Swift, President; Nelson, Morris & Co., Armour & Co., George H. Hammond & Co., have sent a letter to the various railroad companies carrying their freight from Chicago and East St. Louis, Ill., and Hammond, Ind., to Eastern points, in which it is protested that existing rates are extortionate, and a material reduction of the same is demanded. The letter gives notice all freight paid from now on under present rates will be paid under protest.

Ticket Commissions.

The Pennsylvania Co. has issued another circular discontinuing the sale of tickets over the following roads: Burlington & Missouri River, Chicago, Burlington & Quincy, Chicago, Milwaukee & St. Paul, Green Bay, Winona & St. Paul, Hannibal & St. Joseph, Kansas City, St. Joseph & Council Bluffs, Missouri Pacific, Milwaukee & Northern, St. Louis, Iron Mountain & Southern, St. Louis, Keokuk & Northwestern, and Texas & Pacific. This makes a total of 32 roads in the West over which the Pennsylvania Company has now ceased to sell. It is said that these roads, which consented to the proposed agreement with the Eastern roads for abolishing commissions, have not fully lived up to the agreement.

The Atchison, Topeka & Santa Fe has issued a circular in which it is strongly stated that no other company has a right to dictate to it in the matter of commission paying, and asserts that the boycotting of one company by another is wholly outside of the Inter-state law. If the payment of commissions is a violation of the act, the Inter-state Commission must be the authority for that decision, and the right of any railroad company to interpret any portion of the law for the Atchison company is respectfully denied.

Sued Under the Inter-state Law.

Suit was begun this week in Iowa against the Chicago, Milwaukee & St. Paul Railroad by the Dubuque Jobbers and Manufacturers' Association under the long and short haul clause of the Inter-state law. The allegation is that the railroad charged a thirty-three cent rate on certain commodities in hardware from Chicago to Adams, Minn., a distance of 334 miles, and a thirty five cent rate from Dubuque to Adams, a distance of 150 miles.

One Thousand-mile Tickets.

An order has been issued by the General Passenger Agent of the Cleveland, Columbus, Cincinnati & Indianapolis, to the effect that 1,000-mile tickets will be sold at $25 after April 25.

Welland Canal.

The work on the new Welland Canal, from locks 17 to 25, inclusive, is rapidly nearing completion. The work in the vicinity of Port Dalhousie is also progressing rapidly, and between locks 2 and 3 will be finished this week. Above that point nothing remains to be done, and it is expected the canal will be ready for navigation about May 2.

The New Duluth Elevator

The new 1,500,000 bushel elevator of the Lake Superior Elevator Company, at Duluth, Minn., has received its first consignment of twenty cars of wheat. The elevator cost $150,000. Its completion raises the long existing wheat blockade.

Rates on Small Shipments of Sugar.

The Pennsylvania fast freight lines will, until further notice, carry sugar in small quantities at the carload rate to all places reached by them west of and including Pittsburgh.

East-Bound Shipments.

The shipments of east-bound freight from Chicago last week by Central Traffic Association roads amounted to 29,822 tons, against 30,147 tons for the week previous. The percentages were as follows: Baltimore & Ohio, 10.9; Chicago & Grand Trunk, 13 2; Pittsburgh, Cincinnati & St. Louis, 9.7; Lake Shore & Michigan Southern, 21.2; Michigan Central, 12.7; New York, Chicago & St. Louis, 9.9; Pittsburgh, Fort Wayne & Chicago, 22.2; Cincinnati, Indianapolis, St. Louis & Chicago, 0.2.

New Coal Rates to the Lakes.

At a meeting in Cleveland of lines interested in the transportation of bituminous coal from the fields to the lakes last week, the following rates were agreed upon: $1.10 a ton for Pittsburgh coal delivered aboard vessels, and 95 cents per ton for Ohio coal so delivered, the rates to take effect on April 25. The chief complaint heretofore has been made by the Pittsburgh coal operators, who have claimed that the differential of 15 cents taken by the Hocking Valley is excessive, and they accordingly asked that the Pittsburgh rate be lowered. The rates have heretofore been ostensibly $1.20 for Pittsburgh coal delivered on board vessels, and $1.05 for Hocking Valley coal, but on this basis the cost of loading the coal on the vessels is figured at 20 cents, making the net rates $1 and 85 cents respectively. There has been no uniformity, however, with regard to loading, and the above rates have not been observed. The rates now adopted, it is said, make an advance for some roads and a reduction for others. They are not satisfactory to the Pittsburgh operators, who wished the differential reduced, but were accepted as the best concession that could be obtained under the circumstances.

ANNUAL REPORTS

Pittsburgh, Cincinnati & St. Louis.

For the year 1886 this company worked the following lines:

	Miles.
P. C. & St. L. Main Line, including Cadiz Branch	198 7
Chartiers R. R	22.7
Waynesburg & Washington R. R	29 0
Pittsburgh, Wheeling & Kentucky	28.0
Little Miami	196.1

The earnings for the year are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Freight	$3,504,742	$2,793,619	I. $711,122	25.4
Passenger	915,302	913,299	I. 2,002	.2
Mail and express	314,558	308,050	I. 6,508	2.1
Other	17,993	18,653	D. 660	3.5
Total	$4,752,596	$4,033,623	I. $718.973	17.8
Expenses	3,130,690	2,681,633	I. 449,057	16 7
Net earnings	$1,621 906	$1,351,990	I. $269.916	1.2
Gross earn. per mile	23,912	20,077	I. 3,834	19 0
Net " "	8.150	6,730	I. 1,420	21.1
P. c. of exps.	65.8	66.4	D. 0.6	...

The result of the year was as follows:

Net earnings as above		$1,621,906
Interest, etc., received		4,974
Total for 1886		$1,626 880
Total for 1885		1,357,414
Increase		$269,466
From the net revenue		$1,626,880
Deduct payments as follows:		
Interest on bonds	$646,990	
" " car trusts	53,660	
" " Little Miami securities	79,444	
Rent of Monongahela Extension	53 278	
Sundries	14,172	
		$847,544
Net results for 1886		$779,335
" " " 1885		480,662
Increase		$298,673
To the above net results for 1886 are added the revenue of Chartier's Railway		111,258
Waynesburg & Washington R.R.		11,755
Pittsburgh, Wheeling & Kentucky		51,662
Little Miami		246.639
One-half profit on St. L., Vandalia & Terre Haute		23,336
Total		$1,223,988
Rental paid	$174,675	
Interest paid Little Miami Co	683,819	
Interest on Cinn. street connection R. R. bonds	51,500	
		889,995
Surplus for 1886		$333,992
Deficiency for 1885		40,158
Increase for 1886		$374,151

The St. Louis, Vandalia & Terre Haute shares half its profit or loss with this company.

The tonnage transported was 4,864,889 tons, against 4,066,386 tons in 1885, a gain of 798,503 tons, the larger portion of which was in local traffic. All classes of freight show an increase, except ore, live stock and agricultural products. The coke traffic shows an increase of about 57 per cent., or 112,038 tons. The gain in the volume of coal was also quite large.

There was an increase in freight earnings of $711,122.42. The average rate received per ton per mile was 6.2 mills as compared with 5.3 mills for the previous year; and while the average cost was increased, the result was an increased profit on this class of traffic.

There were carried 1,321,432 passengers, as compared with 1,261,427 in 1885, there being a gain in local and a loss in through travel. There was an increase of $2,002.90 in passenger earnings.

As a natural consequence of the increase of traffic, there was an increase in operating expenses, especially in the Maintenance of Way Department. This is due to the fact that a large sum expended in permanent improvements was charged to expenses. The main items of this outlay were the construction of double track upon the Columbus & Newark Division, from the Ohio Central Junction to Union, 2.6 miles, and from Caldwell to Big Walnut, 5.1 miles, and upon the main line from Collier's to Wheeling Junction, 5.9 miles; the work upon the Bulger tunnel; the completion of the change of channel of Harmon Creek; the connection with the Cleveland and Pittsburgh road at Steubenville, and the expenditures upon the new shops at Dennison and Columbus, the total outlay at the latter point on buildings, tracks and machinery up to the close of 1886 being $395,711.85.

The only charges to construction and equipment were $35,537.50 on account of car trust payments, and $60,624.23 in settlement of an old claim against that portion of the road located in West Virginia.

CHARTIERS.

The result for this road was as follows:

	1886.	1885.	Inc. or Dec.	P c.
Earnings	$217 043	$137.234	I. $79,809	58 1
Expenses	95,065	91.678	I. 3,387	3 6
Net earnings	$121.978	$45.556	I. $76.422	167.5
Hire of equipment	10,720	8,276	I. 2,444	27.0
Balance rental	$111,258	$37.281	I. $73.977	198.3
Gross earn. per mile	9,436	6,019	I. 3.417	56.8
Net " "	5,303	1.998	I. 3,305	165.2
P. c. of exps	43.8	60.8	D. 23.0	....

The improvement in traffic is due to the development of the Washington County oil field.

WAYNESBURG & WASHINGTON.

The earnings of this road for the year were as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings	$43,218	$39,967	I. $3,250	8.1
Expenses	31,463	32,793	D. 1,330	4.0
Net earnings	$11,755	$7,173	I. $4,581	63.8
Gross earnings per mile	7,490	1,378	I. 112	8.0
Net " "	405	247	I. 158	79.0
Per cent. of expenses	82 8	82.0	D. 4.2	...

PITTSBURGH, WHEELING & KENTUCKY.

The operations of this line were as follows:

	1886.	1885.	Inc or Dec.	P. c.
Earnings	$160 876	$128,024	I. $32,852	25.6
Expenses	96,026	88,733	I. 7,293	8.3
Net earnings	$64,849	39.291	I. 25,558	65.0
Hire of equipments	13,187	12.157	I. 1,030	8.4
Balance rental	$51.662	27,133	I. 24,528	90.5
Gross earn. per mile	5,745	4,508	I. 1,247	27.7
Net earn. per mile	2,316	1,384	I. 932	66.5
Per cent. of expenses	59.7	69.3	D. 9.6	..

LITTLE MIAMIE.

The operations of this road for the year were as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Earnings	$1,595,265	$1,447,130	I. $148,135	10.2
Expenses	1,545,254	1,323,168	I. 222,086	16 7
Net earnings	$50,011	$123,962	D. $73.951	59 6
Interest, etc	196,628	167,381	I. 29.247	17.5
Total	$246.639	$291,343	D. $44.704	15 3
Rental	715,319	715,319	.....	....
Loss	$468,680	$423.976	I. $44.704	10.5
Gross earn. per mile	8,139	7,387	I. 752	10.1
Net " " "	255	633	D. 378	63 0
Per cent. of expenses	96.8	91.4	5 4	....

The increase in expenses was largely in maintenance of way, and was due almost entirely to the cost of repairing damages to the bridge and road-bed caused by the flood of May 12, 1886. New freight yards were built in Cincinnati. Nearly 3 miles of additional track and sidings were laid.

Chesapeake & Ohio.

This company owns the following lines of road:

	Miles.
Phœbus to Old Point Junction, Va	7.84
Newport News, Va., to Huntington, W. Va.	494.05
Total operated	501.89
Huntington to Big Sandy River	8.88
Total owned	510.77

That part of the road between Huntington and the Big Sandy River is leased to the Elizabethtown, Lexington & Big Sandy Railroad Co., and its operations are not included in this report. The earnings for the year were as follows:

	1886.	1885	Inc. or Dec.	P.c.
Freight	$3,319,371	$2,639,569	I. $679,802	25.7
Passenger	630,574	570,484	I. 60,392	10.5
Mail, express, etc	146,103	151 485	D. 5,381	3.5
Total	$4,096,048	$3,361,235	I. $734.813	21.8
Expenses	2.867,982	2,374,160	I. 493,822	20.7
Net earnings	$1,228,066	$987,075	I. $240.991	24.4
Gross earn. per mile	8,144	6 697	I. 1,447	21.6
Net " "	2.441	1,966	I. 475	24.1
P. c. of expenses	70.0	70.6	D. 0.6	...

The total number of tons of freight carried was 2,174,523, an increase of 17.5 per cent. over the previous year. The average haul per ton was 281.89 miles, an increase of 22.31 miles, or 8.5 per cent., per ton over 1885.

The total number of passengers carried during the year was 565,848, an increase as compared with the previous year of 63,075, or 12.5 per cent.

The operating expenses were distributed as follows:

	1886.	1885.	Inc. or Dec.	P c.
Transportation	$1,045,871	$954,463	I 91,408	9.5
Motive power	889,202	679,689	I. 209 512	30.8
Maintenance of cars	371,312	253,612	I. 117.699	46.3
Maintenance of way	488 658	382,663	I. 105.995	27.6
General expenses	72,938	103,732	D. 30,793	29.6
Total	$2,867.981	$2,374,159	I. $483,822	20.7

President Huntington's report says:

"Although the percentage of operating expenses to earnings has been slightly less this year, being 70.01 per cent., against 70.63 per cent. in 1885, there has been a marked increase of expenses in every branch of the company's service appertaining to its physical operation and maintenance, due to the increased traffic, and the extraordinary repairs and renewals necessitated thereby. In the expenses for the maintenance of the roadway, track and buildings there has been an increase of $101,527.20, of which $81,958.93 was occasioned by the renewal of cross-ties; in those contingent upon train mileage, there was an increase of $229,748.67, of which $82,398 37 was for repairs of locomotives, and the remainder due to an increase of $535.777 train miles, being 13.43 per cent. greater than in 1885; in those contingent upon car mileage there was an increase of $120,850.28, of which $25,066.33 was for car hire, and $80,756.74 for repairs of freight cars. A large number of freight cars that were out of service at the beginning of the year have been put in good order, and such as were destroyed and condemned during the year have been replaced with cars of the company's standard design and capacity.

"In the mileage of the passenger equipment there was an increase of 51,671 miles, 1.34 per cent., and in that of the freight equipment an increase of 11,084.828 miles, or 17.91 per cent., over 1885. In the expenses of administration there was a decrease of $29,512.53 over 1885.

"The coal tonnage has increased from 902,969 tons in 1885, to 929,052 tons, or 2.88 per cent.; the local from 579,527 tons to 617,372 tons, or 6.52 per cent.; and the through from 367,440 tons to 628,119 tons, or 70.94 per cent. The rates received per ton mile have been respectively: from coal, .436 cent; local, 1.139 cents; through, .495 cent; the average being .541 cent, a fraction less than was received in the preceding year.

"As shown above, the company failed to earn the 1 per cent. interest paid on the series "B" bonds May 1, and the 1½ per cent. paid Nov. 1, by the sum of $198,907.81, even after applying the earnings over operating expenses in the months of November and December toward the obligations for the year. This leaves applicable toward the interest maturing on said bonds on May 1, 1887, only the surplus of the first four months' operation in 1887, and attention is now called to this fact. We should, however, take cognizance of the fact that the above statement included $110,210 for interest paid and charged against the operations of the year 1886, that had accrued in 1885, and that the payments for equipment have been somewhat larger than usual.

"It is difficult to anticipate the effect of the Inter-state Commerce law upon the future earnings of this property, but it is fair to conclude that the intention of this law was not to effect a general reduction of railroad earnings, but rather to equalize rates. Any other construction would necessitate the conclusion that the law was passed to obstruct and not facilitate the commerce of the country, and we cannot believe that such was its object."